Vol. 39, No. 7

The Shop Teachers' Professional Magazine

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

For communication outside normal channels

Photo courtesy Westinghouse Electric Corp.

THERE are times when communication via ordinary channels is inadvisable or even impossible, and extraordinary means must be used. During war for example, secret ship-to-ship or ship-to-shore conversations are held by means of an infrared lamp which gives off invisible light. Its beams are modified by the current set up by a voice speaking into an ordinary microphone. These "modulated" but invisible beams are picked up by a detector photo tube as far as 10 miles away and transformed back into the voice again!

There are times when educators have to use extraordinary means to communicate with their students. Most of the work of education consists of just such "communication outside normal channels." This is the communication of ideals, enthusiasm, ambition, the idea of disciplined work toward a goal. Not in the curriculum, yet the most vital part of the educational process, when you have given a boy *these,* you have given him the *tools* to work with and all else is but the material he will work upon.

How give him these tools of the spirit? Not by saying: "Boys, let's be enthusiastic; let's have high ideals." Instead, example does it. One way is to make sure of the *material tools* that will be provided him . . . to make sure for example that the drawing tools used by a student of mechanical drafting suggest, reflect and *do not contradict* the ideas you are trying to communicate to him. Let careful craftsmanship *here* communicate the idea of careful craftsmanship *there,* in classroom work. Let the realization . . . that *these* instruments *if of professional quality* are used by great engineers . . . communicate the idea of greatness to the youngster. Example, *not contradiction*. And anything less than *fine* tools will contradict all you are trying to say.

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Write for Bulletin 402

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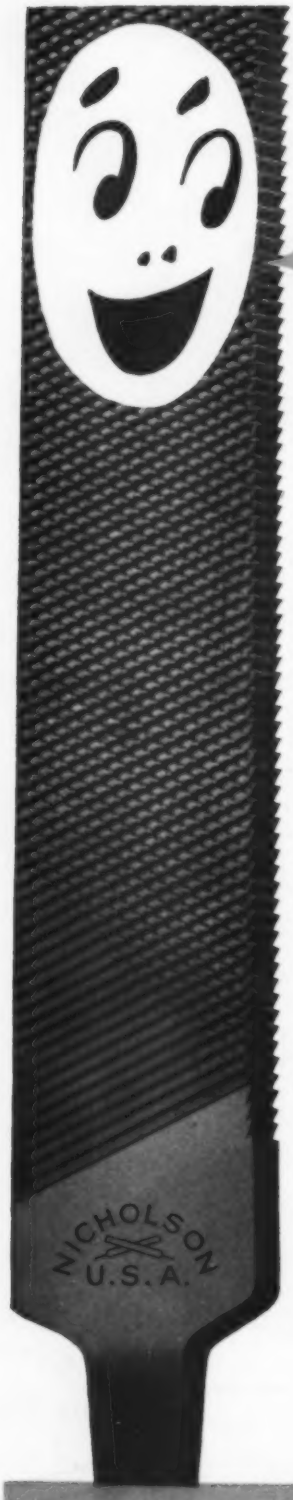

"Did I ever tell you about my 18 operations?"

"Eighteen! That's a lotta operations on any anatomy. But these were not the hospital kind. They're the basic manufacturing operations that have given Nicholson and Black Diamond files the reputation of being the toughest, bitingest, lastingest files made.

"But the agonies I went through to get that way! Even as a raw strip(ling) from the steel mill, Nicholson had a finger in my welfare—specifying the kind of stuff I had to have 'fore they'd consent to operate on me. At the warehouse they put the steths on me and my buddies. We hadda be right. Or else! Then to a clip joint where we were measured for size and our first knifing. Whammie! Everything went blank. *I* was a *flat* blank (no teeth).

"Checked against a model—a tattletale if I ever saw one—I hit the forging room. They turned on the heat—to soften me up. Notched me where my heel was to be. Fashioned one end of me into a tail (tang, they call it). More heat, and I'm rammed into a die for another 'do-or-die' operation. When I came out, *voilà!* I had myself a nice tapered point. Hurt? Me? You forget, sir, that I can take it.

"Now they tell a batch of us blanks we gotta be annealed—to tone us up so we can have our teeth knocked in. More torture. Some of us came out of the oven looking like we'd been on a bender. After being straightened out and cooled, a few of the fellas were eenie-meenie-minied to make the supreme sacrifice. A bone cracker broke 'em smack in half. With magnifiers the fractures were searched for bugs in the grain of the steel. Our batch got a clean bill. 'But you never can tell,' said the inspector.

"Next, off to the grinding and drawfiling rooms to get our backs, sides and bellies smoothed . . . so all our teeth would be of even height and their points sound and clean as a hound's tooth. Not a molecule of decarburization was to remain. Very fussy, those Nicholson folks. They'd remove a flyspeck if it indicated the slightest letdown in Nicholson quality.

"There's that model again. Check. Okay, and we're headed for the cutting room. Here come the slashers—murderous-looking machines with ver-r-ry sharp chisels poised for the kill. This was *it*. I either make it or I don't. I was laid on a nice, soft zinc operating slab. In a few seconds it was all over. A thousand gashes—but I had a fine set of teeth. We lost a few of my buddies—because here at Nicholson only the fittest survive.

"I was a bit flabby from the annealing. They fixed that. Gave me a bath. Told me it was a mud bath, but it smelled like old ground-up bones. Another heat treatment—in red-hot lead; and another quick bath in a tub of cold water. I blew off some steam, but came out hard as nails. Another bath, and another (I was ready to scream). First a cleansing bath, then a lime-water.

"More. They took us unscathed patients to another operating room and sand-blasted the ugly film off our teeth. Boy, were they sharp and glistening! I thought I was ready to go places. But no, we gotta have another hot poultice—to take the brittleness out of our tangs. And another bath—in oil-and-water. Ugh! The oil was to protect us after an oven dried up the water.

"We hop a conveyor for the final tests. A prover gives us the cold steel—hard as aitch—to see if we can bite keenly and evenly. I gave him plenty of evidence! Then I was picked up and had my shoulder banged on a metal block to see if I was sound (no hidden fire cracks). I passed, was wrapped, boxed and ready to meet you through your industrial distributor. I'm a Nicholson Flat File that'll win your smile when you feel my bite and note my fine physical condition and long-lasting toughness.

A. Nicholson File

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THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

VOL. 39 No. 7

SEPTEMBER, 1950

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Vacation's End

Most of our readers will be quite happy that vacation time is over. They feel glad to get into the customary routine again, because they know they have a vital job to perform and they are eager to get at it.

We hope that the vacation — no matter how spent — holds many pleasant memories, and that the return to the year's duties will be agreeable not only now but during the rest of the year.

We hope also that the Korean affair will be quickly ended in such a manner that the internal and external enemies of our country will see the ultimate futility of their efforts, and that our schools can educate youth for peace — not for war.

This Month's Cover

The photograph for this month's cover was submitted by John L. Hopkins, Superintendent, Board of Education, Hastings-on-Hudson, N. Y.

It pictures a student working at a lathe in the machine shop. He is wearing safety goggles as do all the other students, as well as the teachers, while engaged in shopwork in this school system.

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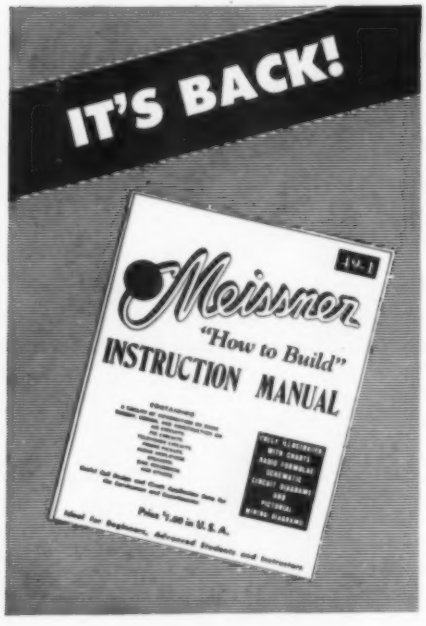

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ASSOCIATION NEWS

AMERICAN INDUSTRIAL ARTS CONVENTION

♦ The American Industrial Arts Association convention was held May 10 to 13, 1950, at the Netherland Plaza Hotel in Cincinnati, Ohio.

The attendance far exceeded that of previous years and the discussions at all meetings were participated in quite freely.

The formal presentations on Wednesday morning and afternoon discussed mainly association matters, pointing out how industrial arts could be improved locally, in the state, and from the national viewpoint.

On Thursday the discussions in the morning were devoted to evaluating industrial-arts teacher education and the speakers were John L. Feirer, Kalamazoo, Mich.; Merrill C. Hamburg, Detroit, Mich.; and William Elsweiler, Huntington, Pa.

The points emphasized that beginning teachers frequently lacked a sound philosophy of their subject, had no well designed projects, offer but little and acted as timekeepers more than as teachers, did not observe safety rules, did not know how to plan their work properly, and did not adjust their work to the ages of their pupils.

At the afternoon session the subject of student participation, and problems of the one-teacher industrial-arts programs were discussed by Kermit A. Seefeld, Santa Barbara, Calif.; Robert D. Helsby, Oswego, N. Y.; Wilson Evans, Berea, Ky.; Rod Dugger, Lake Wales, Fla.; and Walter R. Williams, Jr., Gainesville, Fla.

A discussion panel consisting of Delbert Dyke, Murfreesboro, Tenn.; Roland Torgerson, Bowling Green, Ohio; Edmund Crosby, Cedar Falls, Iowa; and Irvin Schulsy, California, Pa.; contributed much thoughtful material to the matters previously discussed and emphasized the need for well-worked-out industrial-arts programs, greater time and more subject covering for teacher trainees, better organization of the industrial-arts work offered, and more use made of visual aids.

Friday morning was devoted to visits to Cincinnati school shops and a choice was given to visit the Rookwood Pottery or the Cincinnati Milling Machine Company plant.

At the afternoon meeting city and state supervision of industrial arts was discussed.

The chairman of this meeting was John M. Hurley, supervisor of industrial arts of New York City.

The speakers — Merrill C. Hamburg, James J. Hammond, and Frank C. Moore — presented helpful suggestions for supervisors to use, such as periodic teacher meetings, help in preparing courses of studies and equipment lists, teacher hobby displays, and social get-togethers in which part of the time is spent in curriculum discussions. Teacher training institutions also should arrange for area meetings where there is no state supervisor or director of industrial arts; and help as consultants to city school systems, etc.

Frank C. Moore, president of the A.V.A. and supervisor of industrial arts in Cleveland, Ohio, urged that supervisors get teachers to co-operate in planning a real course of action, and in promoting industrial arts on every occasion.

The association banquet was held Friday evening. The chairman on this occasion was D. Arthur Bricker, Cincinnati's supervisor of industrial arts.

The speakers were John R. Ludington, Washington, D. C., and DeWitt Hunt, president of the American Industrial Arts Association.

The Saturday morning session was given over to some excellent laboratory demonstrations. Among these were Michael Kuzma's, Dayton, Ohio, on photography; and Walter Conachen's, Detroit, Mich., on aluminum casting; and John N. Frank's, Sapulpa, Okla., on pottery.

At the business meeting the following officers were elected for the coming year: president, DeWitt Hunt, Stillwater, Okla.; first vice-president, J. Lyman Goldsmith, Los Angeles, Calif.; second vice-president, Floyd Taylor, Miami, Fla.; third vice-president, Merrill Hamburg, Detroit, Mich.; fourth vice-president, Sylvan A. Yager, Terre Haute, Ind.; secretary-treasurer, D. Arthur Bricker, Cincinnati, Ohio.

The total registration of members was 373. There were 31 exhibitors at the convention.

The 1951 meeting will be held at New York City on May, 3, 4, and 5.

The 1952 convention city will be Chicago, and the 1953 meeting will be held at Detroit.

♦ Thirty-three new members were formally initiated into Theta Chapter, Epsilon Pi Tau, the Stout Institute, Menomonie, Wis., on May 13: Charles Ayers, Two Harbors, Minn.; William Baer, Wisconsin Rapids, Wis.; Ellis Bibb, Weldon, N. C.; Russel Boettner, Wyandotte, Mich.; John Brandt, Hibbing, Minn.; Donald Chartraw, Crandon, Wis.; Robert Hartig, Baraboo, Wis.; William Hehli, Menomonie, Wis.; William Heinkel, Milwaukee, Wis.; Stanley Hoffman, Escanaba, Mich.; Stanley Iverson, Waseca, Minn.; Warren Johnson, Rhinelander, Wis.; George Kinsler, Oshkosh, Wis.; George McGowan, Iron Mountain, Mich.; Thomas Miller, Rockmart, Ga.; Norman Mitby, LaCrosse, Wis.; Robert Morris, Ingram, Wis.; Charles Mwbray, Fond du Lac, Wis.; Charles Mueller, Ironwood, Mich.; Fred Pollock, Glenshaw, Pa.; Raymond Post, Cadott, Wis.; David Randall, Woodville, Wis.; Mathew Reneson, Menomonie, Wis.; Henry Roesler, Milwaukee, Wis.; John Rutherford, Tomahawk, Wis.; Ralph Schauer, West Allis, Wis.; Charles Schiferl, Fort Atkinson, Wis.; Leslie Springmire, New London, Wis.; Russell Tews, Jefferson, Wis.; Charles Thomas, Menomonie, Wis.; George Tinetti, Mosinee, Wis.; Donald Van Braemer, Two Rivers, Wis.; and Garth Wilcox, Wabeno, Wis.

President of the chapter, Will Malone, introduced Dean Bowman, who gave the welcoming address to the new members.

♦ Chico State College's Kappa Chapter of Epsilon Pi Tau initiated eleven new members at the Annual Spring Banquet held at the Hotel Oaks, Chico, Calif., May 20, 1950. The neophytes included: Donald E. Abbott, Ralph V. Chmelka, Gareth S. Ford, Clifford R. Gilbert, Allen W. Hill, Robert Koskela, Thomas A. Lee, Jr., Victor F. Pierrot, John W. Smullen, Richard W. Thomas, August Winter.

Officers for the coming year were installed. They are: president, Joseph D. Rukavina; vice-president, Lewis H. Guglielmina; secretary-treasurer, Leslie Ferguson; and corresponding secretary, Loren L. Wilbur.

Russell B. Kidder, trustee of Kappa Chapter, introduced the speaker, Dr. Einar E. Siro, head of the industrial-arts department at Chico State College, who spoke on the topic, "How We Have Grown." — *Leslie Ferguson.*

♦ At the annual Indiana Industrial Education Association convention held April 27–29, 1950, at Turkey Run, Ind., the general theme was "Graphic Arts: Economical Enrichment for the School Shop."

The purposes and aims of the exhibition were to show how graphic arts can be made more meaningful in the already existing general shop program with limited inexpensive materials, tools, and supplies.

The members of the demonstration team were: Joe Boyd, Wilson Junior High School, Muncie; Frank Bryan, Desota High School, Desota; Robert Epperson, Selma High School, Selma; William Roseberry, Ball State Graduate Student; Porter Trickel, Ball State Student; Frank Moore, Ball State Student; William Hanks, Ball State Student; Bernard R. Josif, department of industrial arts, Ball State Teachers College.

(Continued on page 6A)

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ASSOCIATION NEWS

(Continued from page 4A)

They demonstrated how to make block prints, bind books, make rubber stamps, and make and use a silk-screen frame.

♦ The annual convention of the Florida Industrial Arts Association, held April 14 and 15 in Miami, Fla., was attended by 150 persons. Prof. Virgil Poling of Dartmouth College spoke on "Recreational Industrial Arts" at the annual banquet.

Marshall Hurst, Miami, was elected president of the association for the coming year. In addition to the banquet and business session, the program included a state-wide exhibit of student work and project demonstrations by industrial-arts teachers. — *Roy F. Bergengren, Jr.*

♦ Loren Palmer, junior from Oswego, was elected president of the Industrial Education Club at Kansas State Teachers College, for 1950–51 in the annual election at the March meeting. Robert Stahl, Junction City, was chosen vice-president; and William Harris, Fort Smith, Ark., was elected secretary. Other officers elected were: Richard McCanse, Baldwin, treasurer; Clyde Gilbert, Pittsburg, publicity chairman; and Professor Forest Penny, sponsor.

♦ Annual election of officers for the coming school year was held by the Alpha Alpha Chapter of Epsilon Pi Tau fraternity at Kansas State Teachers College in March.

The newly elected officers are: president, Franklin King; vice-president, Wayne Craven; secretary-treasurer, Kenneth Mendenhall; program chairman, George Miller; and faculty adviser, Dr. O. A. Hankammer. Refreshments were served.

♦ The Birch Coulee Industrial Arts Club held its spring sectional meeting on April 27, 1950, at the Redwood Falls High School, Redwood Falls, Minn.

B. F. Carson of Fairfax, Minn., was elected president, and G. V. Tyrrell of New Ulm, Minn., was elected secretary-treasurer.

Following the business session, a demonstration of internal carving of plastic was given by Howard Nelson, assistant professor of industrial arts at the University of Minnesota.

P. J. Aurelius of the Minnesota Mining and Manufacturing Company, gave a demonstration of the uses and advantages of waterproof abrasives.

Metal spinning was demonstrated by Mr. Burdette of the State Teachers College at St. Cloud.

T. J. Berning, assistant commissioner of education, gave a talk following a six o'clock dinner.

The fall meeting will be held at Redwood Falls, Minn., on September 30, 1950. — *B. F. Carson.*

♦ The instructors and administrators of industrial arts and vocational education in the Four-State area can look forward to a beneficial conference this autumn. Plans are already under way for the conference, and some of the programs have been planned and the speakers selected.

The conference is to be held Friday and Saturday, October 6 and 7. The featured conference speaker this year is to be Frank Moore, who is in charge of industrial education in the Cleveland public schools, and who is the 1950 president of the American Vocational Association.

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Personal News

DANIEL GREEN DIES

July 20, 1950, brought to a close the fruitful teaching career of Daniel Green, who spent 26 years of his life as teacher at The Stout Institute, Menomonie, Wis.

He was born at Fort Hale, S. Dak., in 1883. He received his elementary teaching degree from Whitewater Normal in 1905.

He taught at West High School, Des Moines, Iowa, and from 1906 to 1917 was instructor of industrial education in Louisville, Ky.

Mr. Green also was director of industrial education at Marquette, Mich., director of industrial education at Elgin, Ill., and head of the department of industrial education at Macomb Teachers College, Macomb, Ill.

During World War I he was assistant superintendent and later superintendent of the Midland Chemical Company of Chicago, Ill. After four years of this industrial experience he was appointed director of vocational education in Richmond, Ind., a position which he held until the fall of 1924 when he joined the faculty at The Stout Institute. During his 26 years at Menomonie he made many friends among the faculty members and students and he will be sadly missed by many who formerly went to him for advice and counsel.

He was the author of "Drawing for Life and Industry," published by The Bruce Publishing Company, Milwaukee, Wis., and has also contributed to the professional magazines in his field. He was a member of the Wisconsin state committee which developed the course of study for drawing.

♦ Christopher N. Rose has been elected Trustee of Inwood Institute, Upper Montclair, N. J. This organization is affiliated with Hanover Institute, Dartmouth College, in a program of research in visual perception. Allied programs of experimentation are being conducted at

(Continued on page 298)

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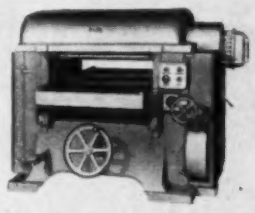
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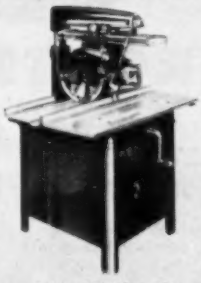
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2 varieties

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3 models
4 varieties

Wood Lathe
2 varieties

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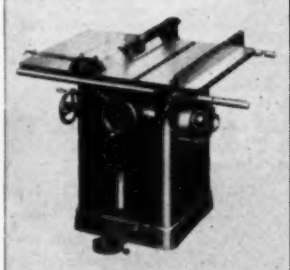
3 varieties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2 varieties

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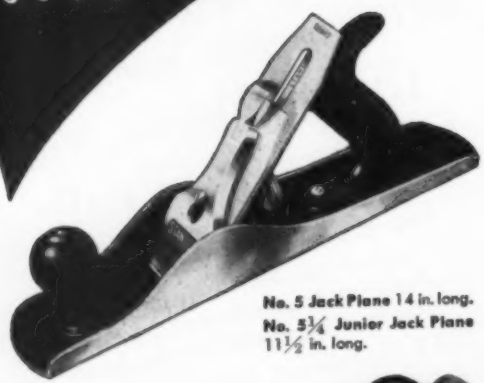

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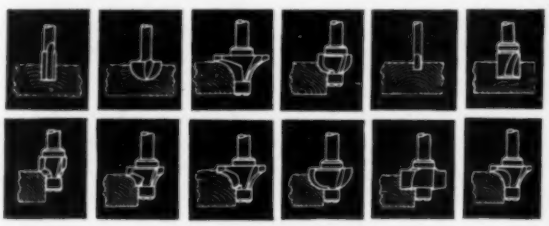

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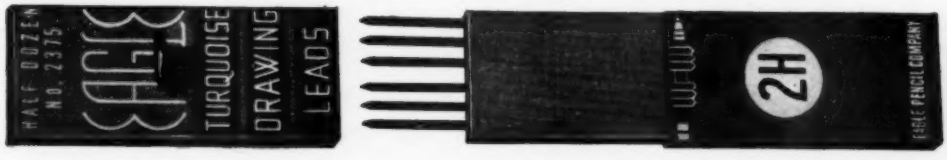

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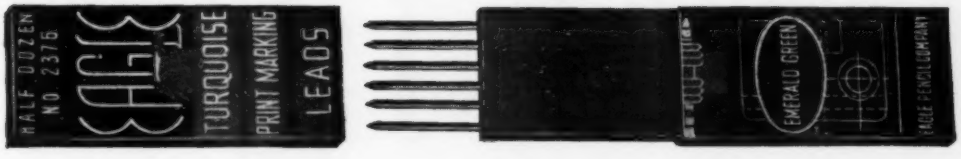

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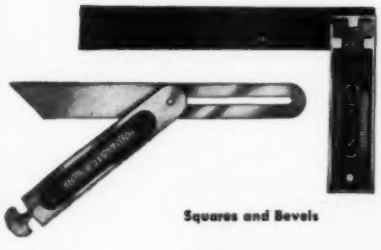

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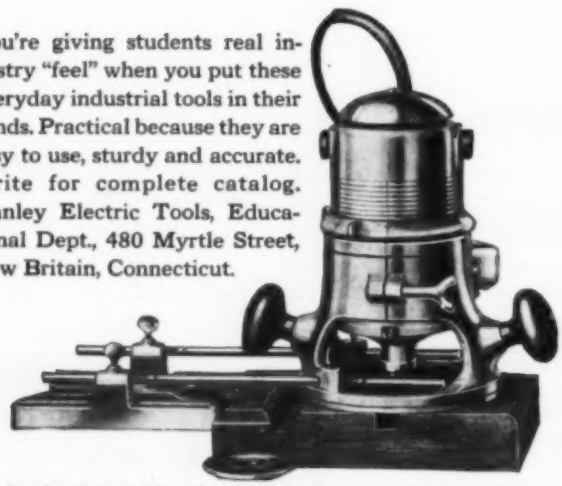

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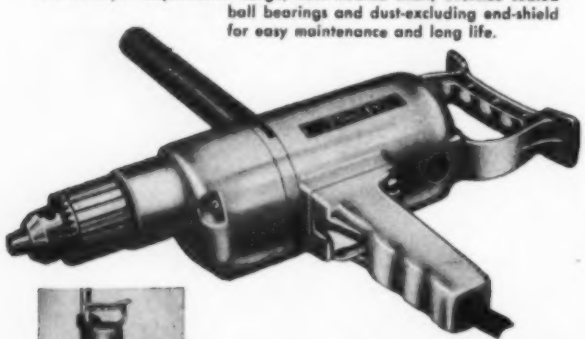

Stanley No. 112½" Electric Drill Lots of power in a compact, lightweight drill. Chuck spindle offset to permit close-quarter drilling without removing pipe or spade handles. Aluminum alloy housing, automatic release safety switch with locking device, thrust ball bearing on spindle, Jacobs 3-jaw Chuck and key.

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For years the Atkins No. 65 Saw has been a favorite with instructors and students alike — with *all* who take pride in their work and who appreciate quality of the highest order.

Now No. 65 has a running mate — a "chip off the old block," so to speak. It is the Atkins Jr.-65 —identical in quality and shape, but smaller in size, with its larger counterpart. This new *proud son of a proud father* has a "Silver Steel" blade only 16 inches long — same Perfection Handle, same taper grinding, same high polish that have made Atkins No. 65 so outstandingly famous!

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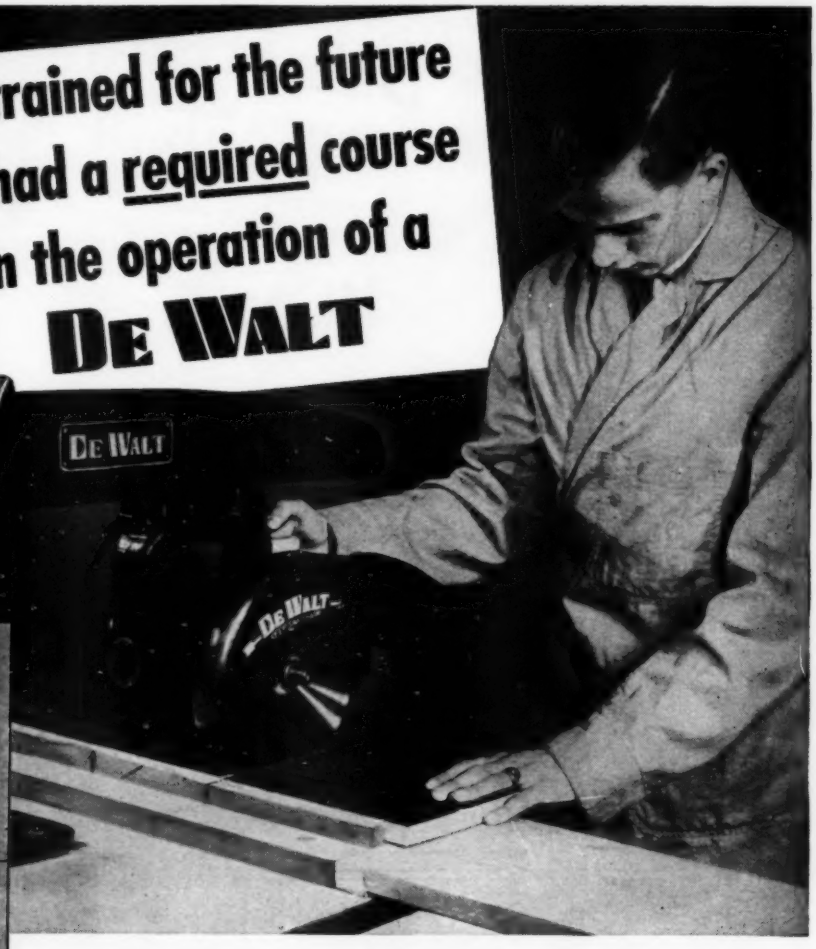
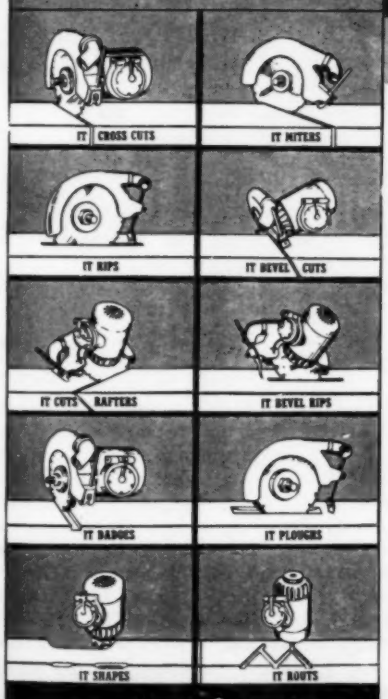
He's really trained for the future when he's had a required course in the operation of a DE WALT



DE WALT is a complete shop in itself



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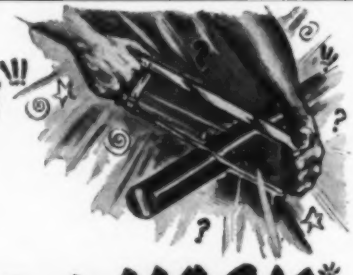

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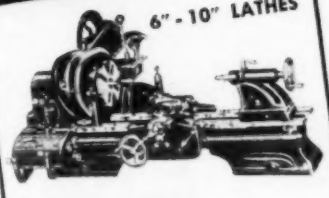

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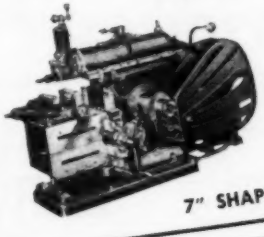

7" SHAPER

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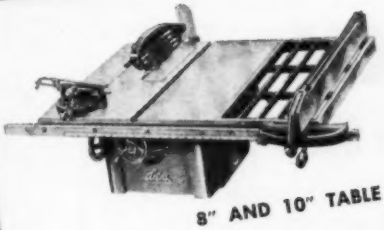
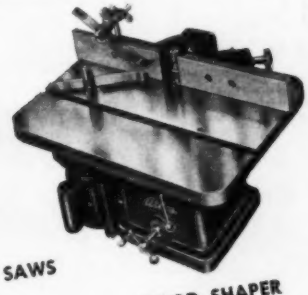
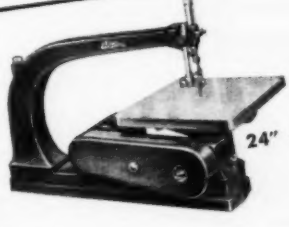


8" AND 10" TABLE SAWS



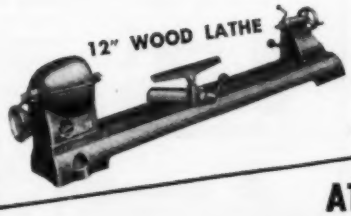
WOOD SHAPER



24" JIG SAW

BELT AND DISC SANDER

10" FLOOR SAW



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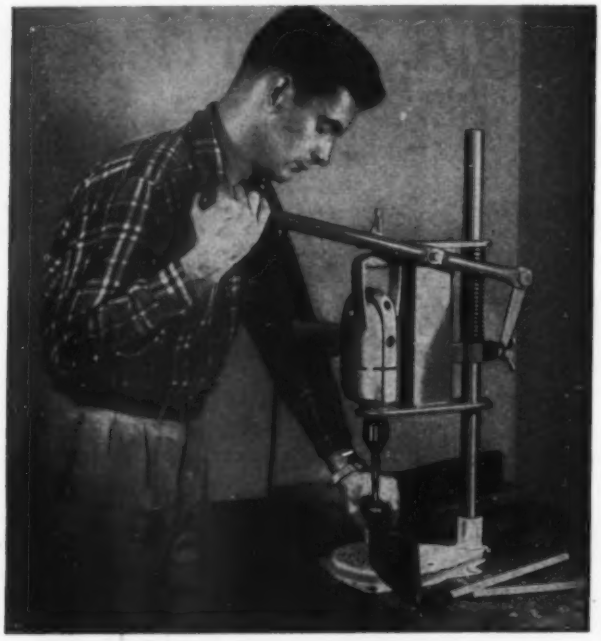

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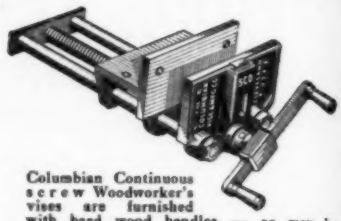
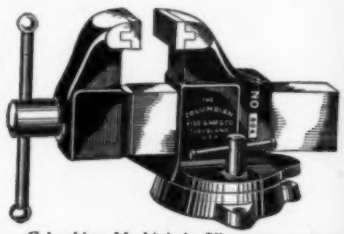


Columbian Continuous screw Woodworker's vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES, as above, to eliminate handle breakage, speed operation and provide extra leverage.



Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

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SHOPSMITH...

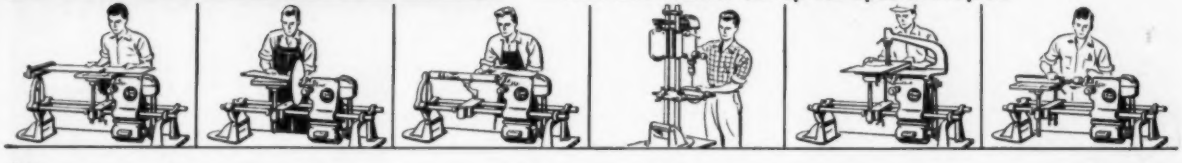
and the FLEXIBLE SHOP

A new concept in industrial arts education has developed around SHOPSMITH. It's the FLEXIBLE SHOP. The idea was first advanced at the California Industrial Education Association Convention earlier this year. Since then, it has grown in recognition and acceptance. It promises important changes in teaching technique. It also assures fuller utilization of shop facilities — in large schools as well as small. Here, briefly, is the idea behind the FLEXIBLE SHOP.

—all SHOPSMITHS set up for Lathe Instruction

the FLEXIBLE SHOP

—with SHOPSMITH set up for Special Projects



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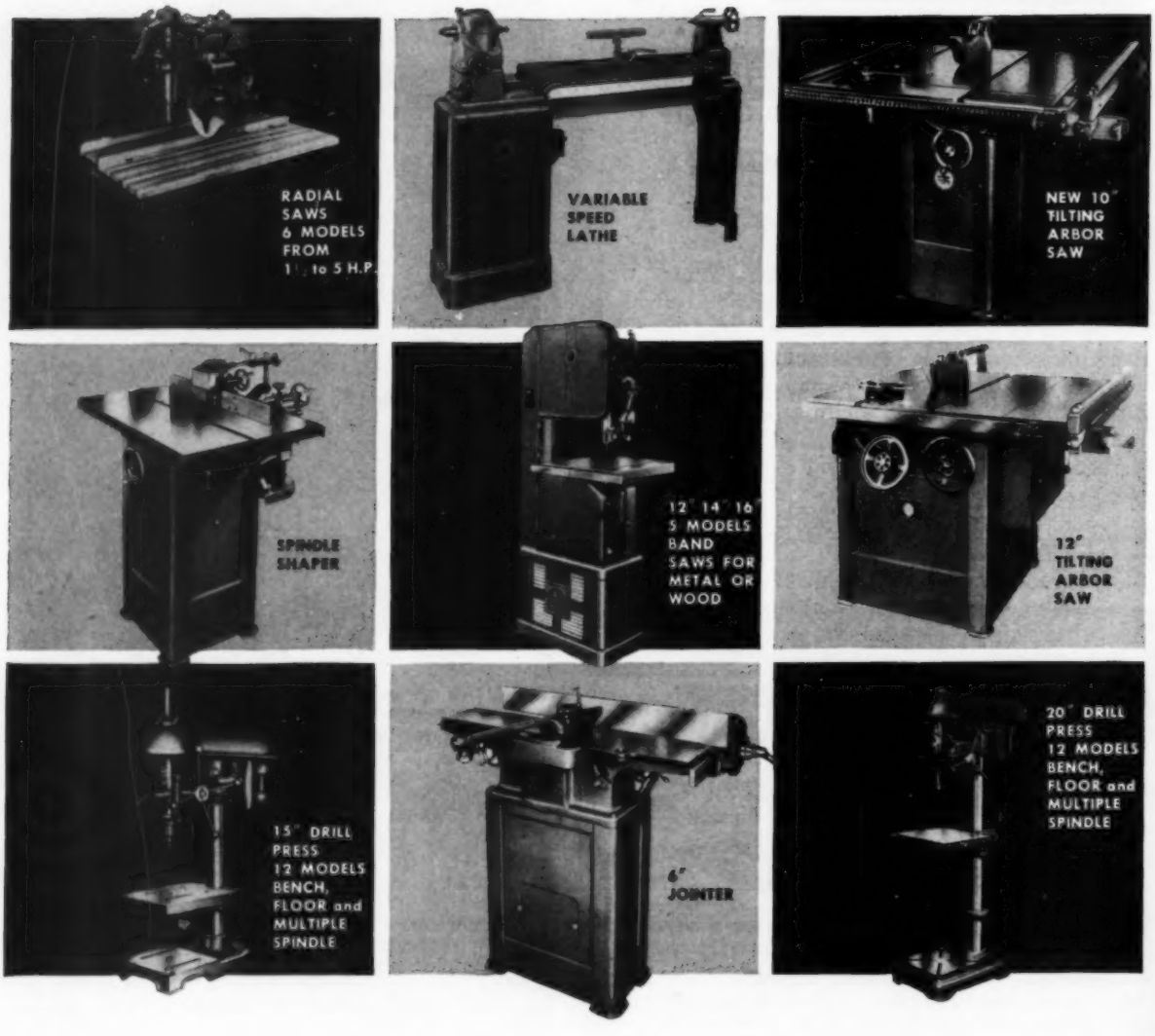
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-IAVE-
SEPTEMBER . . 1950

Maturity of the Vocational School Graduate

MEREDITH W. DARLINGTON,
Miami, Fla.

Are vocational high schools helping students grow into adults who live an abundant life relatively free from worry? These schools are doing a good job in the teaching of trades and in guiding students into careers in line with their interests and abilities. The student's development toward a mature personality, however, cannot always be left to chance.

No graduate, or adult for that matter, is completely adjusted or mature in his efforts to solve all his problems. Normally, most grownups face problems and make decisions without hesitation or concern. Some problems, however, take longer since the individual is concerned with several different possible decisions. He feels the need for time to get information and consider the outcomes or consequences of each proposed solution.

Before teachers attempt to evaluate their efforts for aiding youth toward the goal of mature adulthood it might be well for them to consider the steps ordinarily taken by a mature adult in solving an important problem efficiently. First, he faces his problem squarely. Second, he gets information about the problem and considers consequences of different decisions. Third, he makes a decision. And fourth, he accepts the consequences of that decision without shifting responsibility or without becoming nervous or worried.

Independent Personalities

The person who disposes of problems in this manner has an independent personality. He has matured. One can best understand such a personality by considering its development toward this independence. A baby is absolutely dependent. He could not survive without constant help. As the baby grows and develops he begins to learn. During the elementary school period, in addition to a mastery of the 3 R's, a pupil is gaining experience in facing problems, making decisions, and then either accepting responsibility for those decisions or placing the blame on others. The child begins to learn that it is the consequence of his decision that is important, not just the making of a decision. Whether in the schoolroom, at home, in Sunday School, at the scout meeting, or elsewhere he is confronted with problems requiring decisions. How he faces them, how he acts, how he accepts responsibility — all these determine whether the child is developing in the direction of mature adulthood.

In the vocational school the teacher must accept the entering student regardless of his level of development and must make every effort to strengthen his ability to solve problems. Teachers must not only be aware of what is involved in problem solving but must also have a "sixth sense" for spotting student problems. If teachers will capitalize on problem-solving situations and if the student is not blocked, progress will be made.

Blocking may hold an individual on an immature level or even force him into greater dependency. If the student is not permitted and encouraged to make decisions and learn what it means to accept the consequences, he will remain dependent and develop ways of getting others to make his decisions. If the teacher is autocratic and harsh, threatening him with a loss of security, he may remain dependent and resentful at the same time. The types of blocking are varied and the resulting dependent reaction may also take a wide variety of forms ranging from complete resistance to helpless attitudes. Dependency is the original condition from which we all start and toward which we all revert to varying degrees in difficulty.

Problems Troubling Vocational Students

Some of the problems a vocational student might ask his teacher are: (1) Should the miter joint on this frame be reinforced? (2) Is the electric line supposed to carry 15-ampere fuses? Would it be all right to use a 30-ampere fuse? (3) What is the best way to keep stored lumber from checking? (4) Does the automobile motor I am overhauling need reboring and new pistons? (5) Upon completion of my vocational training I have an opportunity to work at Firm A or Firm B. Which place should I choose? (6) I think I want to be an electrical engineer. Should I go to college or had I better be a journeyman electrician?

Problems of these types are of more concern to some students than to others. An individual may use a mature, independent approach in solving one of his problems and then revert to complete dependency in another. The type of assistance given depends on the individual needs of the student at the time. There is no cure-all procedure or one best answer. The teacher must be able to quickly and skillfully appraise the problem and the student in order to know when a situation merits his time in strengthening the student's problem-solving ability. An entire class can share in the consideration of some problems. In other cases it is an individual affair, giving the teacher that rare opportunity to work creatively with his pupil.

Basic Principles to Be Considered

Several basic principles that teachers should consider in the matter of stimulat-

ing and strengthening problem-solving ability follow: First, be an authority in your field. Know your trade and how to teach it. Know the requirements for being a successful journeyman. Know also how to evaluate with a student his chances for success. A teacher must be accurate on all matters. This makes you a professional educator and keeps you that way in the eyes of your students.

Second, in helping a student, keep his problems his. Adjust your assistance to the level and background of the student. If the individual cannot make big decisions, there is some level on which he can make smaller ones. Try to find his level. Try to define his problem so that he can deal with it, if only partially. As a teacher you should understand the student's inability to make decisions without criticizing him. The student's experience should not be made another proof of his weakness. If he is dependent, he will try to make someone else take over his responsibilities. He will raise endless objections. He will express discouragement. If the teacher makes the decision for him, dependency will only be encouraged. If, however, the situation is such that the student cannot make a decision on even a minor part of the problem, then the teacher must act for the student. The teacher must be aware, however, of what he is doing and attempt to apply some part of the deliberation in such a way that some phase of the student's problem-solving ability might be improved.

Third, do not make the student's problems your problems. Do not identify yourself or your feelings with the student's. Personal history or experiences have no place in this helping situation. This is equally true of those parts of the student's life which are not relevant to the problem at hand. Allowing them to be brought in reduces the effectiveness of the situation. Keep the entire matter friendly and businesslike.

Fourth, do not analyze or interpret the reactions of the student to him. Don't tell him he is refusing to face a problem, afraid to make a decision, or holding on to an idea for personal reasons. This may be the basic difficulty, but it cannot be removed simply by asking a person to change. The importance of understanding the student lies not in being able to change him immediately but in being able to accept him and to adjust your own responses and help to him.

How can the teacher apply these four basic principles to specific problems upon which the student is likewise applying the four steps for mature problem solving? Consider the student who asked whether he should be a journeyman electrician or go to college for training as an electrical engineer. You would not give this individual an off-the-cuff answer. Nor would you hustle him off to the principal or some other faculty member. As his major instructor, this student has confidence in you. He respects you. He has given you a real compliment by bringing his problem to you.

Since you are an authority in your field, you will help the student consider all important factors involved. You will help him face this problem and will see that he secures all the important information concerning it. The student should be directed to source material which gives the nature of the work, general qualifications for engineers, employment possibilities, costs of going to college and other information. You may direct him to practicing engineers for a conference. Since more information concerning the student's academic possibilities will be needed you will secure the assistance of the guidance counselor in the school. The student will discuss this matter with his parents for they, too, are involved. If more information is needed concerning possible work as a journeyman, it will be secured.

You have helped the student secure information and consider each part of the problem. He has made a decision on each part. Now he is ready to add all the parts, to obtain the final answer. If solving each of the parts was successful, determining the final sum should not be difficult. In fact, the basic solution unfolds almost automatically as the student arrives at a decision on each of the parts.

Final Decision to Be Made by the Student

The skillful teacher will so aid the student that to him it appears that the final decision was all his. This is as it should be, for who should decide an individual's vocational future but himself? By making the decision, the student is placed in a position to accept full responsibility for whatever happens in the future. Never will he say two, five, or even ten years from now that a "blankety-blank" teacher in that vocational school gave me a bum steer.

As indicated previously, students will not have major problems very often needing this type of careful approach for their solution. But when such problems do arise, it is imperative that the vocational teacher help the student apply mature problem-solving techniques. Where else will a student learn these procedures if not under the guidance of his teacher? Since the vocational school is the last contact most students have with professional educators, for many students it is a case of mature development now or trouble and worry ahead. Definite teaching for a better adjusted student today will enable the vocational school to make its greatest contribution to our society. Its graduates will grow into mature adults who will stop worrying and live.

Surface grinding

Photograph submitted by Robert D. Helsby, industrial arts instructor, State Teachers College, Oswego, N. Y.

How Good a *School Administrator* Would You Make?

HEBER A. SOTZIN
Director of Industrial Arts
San Jose State College
San Jose, Calif.

A generation ago, shop teachers with a bachelor's degree were as scarce as the proverbial "hen's teeth." The majority came into teaching directly from industry and many lacked, even, a high school education. They were hired on the basis of practical skills and a reasonably good personality. Today, thousands of shop teachers have earned the bachelor's degree, hundreds the master's degree, and an increasing number is matriculated for and working toward the doctorate.

The problem of advanced degrees for practical arts and vocational teachers is allied to administrative work. Those who earn advanced degrees will probably fall into two major classifications: (1) the master teacher and (2) the administrator. There are those who will desire to equip themselves to become better teachers and who wish to do research in a particular manipulative or technically related area; while others look hopefully toward becoming supervisors, directors, principals, and even superintendents of schools. Before aspiring to executive work it might be advisable to do some self-examining and evaluating. It is presumed that a teacher has a good general education and is well trained professionally.

To test oneself, it is suggested that the following major factors be studied carefully and then score yourself according to the following plan: (*a*) superior — 3 points; (*b*) above average — 2 points; (*c*) average — 1 point; (*d*) below average — 0 points.

1. *Physical Vigor and Health*
Ask yourself: Do I usually enjoy good health? Do I possess physical and nervous endurance? Do I tire easily under long hours of work and disconcerting problems? Do I have good recuperative powers? Do I sleep well? Can I relax easily and feel refreshed? Do I have the ability to work long hours including evening assignments and numerous outside commitments? Have I had a serious illness or surgical operation which will hinder me professionally? (*a*) Superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

2. *General Appearance*
Ask yourself: Am I well groomed? Do I dress conservatively? Do I pay attention to shaving, haircuts, shoeshines, clean linen, pressed clothes? Do I have good posture? Do I have serious or objectionable physical defects? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

3. *Social Background, Intelligence, and Scholarship*
Ask yourself: Am I proud of my family background? Do my kinfolks compliment me or embarrass me? Am I proud of my immediate family? Did I do well as a student in school? Do I fall in the upper brackets intellectually? Has my scholarship been a matter of personal pride and enjoyment? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

4. *Use of English*
Ask yourself: Do I speak well? Do I speak convincingly? Do I express my thoughts well in writing? Do I enjoy making a public address? Do I possess speech defects or speech peculiarities that are difficult to overcome or annoying to others? Are people usually complimentary when I am asked to make a speech? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

5. *Personality*
Ask yourself: Do I possess a sense of humor? Do I take myself too seriously? Am I usually well poised and self-controlled? Am I resourceful? Do I possess initiative? Do I usually observe the accepted social amenities? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

6. *Ability to Make Decisions*
Ask yourself: Do I possess courage to make major decisions, knowing they will not be popular? Do I enjoy solving knotty problems? Do details annoy me? Am I willing to delegate authority and decisions to others? Do I usually give a problem much study and thought or am I inclined to make snap judgments? Do I vacillate in arriving at conclusions? Am I easily influenced by others, particularly those who are influential in the community? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

7. *Ability to Handle Finances*
Ask yourself: Do I appreciate the value of a dollar, particularly when it belongs to others? Do I conduct my own financial affairs successfully? Do debts worry me? Do I live within my income? Have I acquired the habit of saving? Can I adjust readily when budget cutting is necessary? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

8. *Ability to Meet People*
Ask yourself: Do I have a genuine liking for people? Do I meet people pleasantly and easily? Am I ill at ease in the presence of my superiors? Am I condescending to people? Do I make friends readily? Do I maintain friendships over a period of years? Am I a *yes man?* (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

9. *Ability to Effect Loyalty*
Ask yourself: Do I give the same amount of loyalty as I expect of others? Do I instill confidence? Are others willing to follow my leadership? Are others willing to work for me and assist me in my work without much reward? Do others usually support me in the issues I advocate? Am I a good team man? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

10. *Selecting Personnel*
Ask yourself: Am I a good judge of human nature? Do I judge a job applicant on a basis of merit or upon the influence of friends and acquaintances? Does political expediency enter into my selection of employees? Am I willing to dismiss an employee if he proves inefficient? Do I support my colleagues wholeheartedly? (*a*) superior.... (*b*) above average.... (*c*) average.... (*d*) below average....

If your total score is 26 or above you will probably do well in an administrative

or in an executive school position. If your score ranges from 20–25 you will probably do fairly well in administrative work. If, however, your grade falls below 20 it is questionable whether you would do well or be very happy as a school administrator. Hence it is suggested, even though a teacher has earned an administrative credential, that he be comforted by the thought that only a few are fitted by nature or destined by circumstance to fill executive posts. Furthermore, it is a wise person who knows his limitations. To labor in the ranks, to be an intelligent follower, to be in direct and intimate contact with boys and girls, and to be privileged to guide and direct their daily learning activities is infinitely more satisfying, than to be a mediocre, perplexed, and disrespected administrator.

Modern Industrial Arts

RALPH E. STUCKI

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Industrial arts, if it is to have a definite place in the general education of an individual, must offer something more than the construction of articles or projects, either teacher selected on a basis of the most important operations found from a trade analysis, or pupil selected according to his interests.

Projects can never be anything else than a way of holding pupil interest. So much has been done with this one device that it has become a method, the only method used. It is easy to use — so easy, that few teachers accept the challenge of providing other interesting educational items of a vocational nature.

Written objectives are good when incorporated into the course of study and really put to use. Much has been written on objectives and what can be done to aid in fulfilling those objectives, but the actual achieving of them hinges on the making of projects. A single device should not be the basis for the formulation of the aims.

Using More than One Educational Aid

Many teachers do not make use of other aids, as films, wall charts, either commercial or shop made, and completed or step-by-step models. It is impossible to show in the small shop the processes in the manufacture of raw materials to a finished form, yet this is sometimes listed as one of the aims of industrial arts. Films, either continuous or strip, offer an ideal way of becoming acquainted with these processes. If a boy is to have any knowledge about industrial life, he should know how the trees in the forest become lumber, how the iron ore in the ground becomes any one of the various alloys; also, how the other metals are changed before each becomes a finished product, how electricity is made and transported, and the uses of it. All phases of printing cannot be told to a student. Here, too much stress has been put on setting a stick of type when many related activities as the different duplicating processes like hectograph, mimeograph, and lithographic work, bookbinding and silk screen work are essential parts of this area of a practical industrial arts.

Teachers are too prone to look on industrial arts only for the part directly related to some trade. Industrial arts is more than this. It is the only representative of industry in the average child's life and as such must increase the range of his interests. It is not necessary to make industrial arts a socialized science activity by studying transportation and communication. Rather, show how the radio, telegraph, telephone, and other modern means of communication operate along with the construction of some projects as the ideal way to maintain interest.

Industrial Arts Covers Many Areas

In order for industrial arts to show even a small part of the industrial life of our country, every means must be used that will put across to the boy or girl something of the expansiveness and greatness of that life. The few small projects that he makes in a semester represent only a minute quantity of the total picture if our industrial arts is to hold the place in the general education it has already gained.

Industry of today uses many new materials and other materials are constantly being found. The industrial-arts teacher cannot rely on the work done in college many years ago. He must keep up to date and at least have a speaking acquaintance with the results of industrial research which relate to his special area. The offering of subject matter should be spread horizontally over many areas instead of stacking vertically over only a few.

Much work on the part of teachers and supervisors will be required because so many areas must be covered. The stacking vertically can come only after the groundwork has been laid by the horizontal spread. Old stand-bys as simple woodworking, metalwork, and electricity are important for many principles are taught by these courses. It is the strict adherence to only so many projects each year that makes the narrowed course.

Detailed planning must be carried out, for the requisitioning of new equipment and tools will be necessary in many cases in order that the students can actually work with the different materials. A movie projector and film strip machine, along with accompanying films are prime necessities.

The New Industrial Arts

The new industrial arts will require that new subject matter be taught as the pupil progresses. This will mean that there must be a systematic advancement to a higher level each year. This is one of the greatest faults of industrial arts. Even the large city school systems have little or none of such advancement so that a student knows he will not have the same work regardless of the number of the course. Supervisors must take the initiative here and decide how much of the total instructional units should be taught for each course. This should be enough for the average class for the length of the course. Much of the related work is simple memory, but it could be changed easily to the problem solving type of reasoning by stressing the application of principles in new situations, and emphasizing the understanding and the relationship of new ideas rather than mere verbal learning. Students will have to do this highest type of thinking if industrial arts is to find favor with educators and retain the definite position it now occupies — a part of the general education of any individual.

Nearly 1,000,000 dependents of deceased veterans were drawing death compensation or pension benefits from Veterans Administration on May 1, 1950. Included were 393,079 widows, 294,011 children, and 293,932 dependent parents.

What Standards Are We Building?

H. W. TEICHROEW

Co-ordinator, Trade and Industrial Education
St. Paul, Minn.

There is a story of the fellow who was walking rapidly down the street, elbows at his sides, hands extended before him. He told an acquaintance he was on the way to buy a square of glass the size indicated by the distance between his hands. What are we in our field of education doing that encourages laymen to smile at our standards?

In a recent national professional periodical, the president of a large eastern concern was quoted as follows: "some of the public relations difficulties of schools today lie in their lack of definition of their aims, and from a failure to interpret those aims to the public." Of course he knows of the cardinal principles.

Our definitions appear to satisfy us, but are we too prone to emulate that character in the Mother Goose rhyme who "stuck in this thumb and pulled out a plum and said, what a big boy am I"? Our definitions should be in the language of the people we serve — or are we willing to say we serve only those in education?

The intention here is a consideration of objectives fundamental to the *service* of vocational education. To do so, let us classify the "gripes," illustrate some of them, and present what we could do about it.

Four general headings under which to classify the "gripes" expressed by people not in education lead to these four statements:

1. Educators ought to get together on a clarification of ideas in education.
2. Expensive curriculums from the elementary school through high schools do not square with the drop-out rate.
3. A tendency to blind acceptance of an old way of doing things is too much in evidence.
4. Federal control of education is not desired, but is encouraged by the failure of local schools to maintain continuing analyses of their own performance.

Laymen, not educators, compose statements such as these.

Fundamental to our standards are our objectives. We are prone to reiterate long-established principles, but we should restate, re-compose, re-phrase, so that *reiterated* does not become synonymous with *trite*. Can we set as one objective, whether we are classroom teachers operating on the firing line or co-ordinators, supervisors, or administrators; that the packaging, the advertising, the marketing of public education be such that the public understands and believes in what it needs, wants, and can use?

An educators' hierarchy, dictating, should not be expected to accomplish alone the task of clarifying objectives so that the public understands them. Our own daily performance on the job does more than volumes of fine phrases. We are firing line operators. Sound vocational education includes a plan to keep down to earth. We say we confer with business and industry to determine what to teach.

Examine therefore these phrases: "offered a course in —," "had a course in —," "take a course in —," "taught a course in —." Careful analysis of performance related to these phrases results in an expression summarized by words such as "expose" and its derivatives. The teaching that was done in Galilee nearly two thousand years ago was in terms readily understood by those who gathered to learn.

Industrial engineers, hired at handsome fees by industry to study ailments and recommend corrections, point out that some in industry say: "It is not changeable" — "It is just impossible to make the change proposed." The answer is that industrial engineers consider nothing as static. They have learned to instruct those who stand in their own light, to help people help themselves wherever they are by their own efforts, and out of their own resources.

Vocational education has a production job, too, not at all unlike that of industry.

To Accomplish the Task Public Vocational Education requires:

1. Quantitative and qualitative selection of persons for preparatory instruction on the basis of proved aptitudes and interests; instruction for apprentices and other employed workers that they may complement their on-the-job training or supplement their on-the-job experience; instructors trained to spur the thinking and imagination of learners using facilities, equipment, and methods geared to the changing needs of individuals as complementary to their work experience.
2. Adequate, authentic information on which to justify changes essential to maintain a dynamic program of education and training geared to industrial and business needs; dependence upon personnel capable of maintaining liaison with those effective industrial and economic forces in the community which affect employment and the full adjustment of workers to satisfactory jobs.

What standards are we building? If we don't have what it takes to accomplish the task, are we on our way?

The Job of Production

For Industry: Processing raw material into a finished product acceptable in the market for which prepared requires:

1. Quantitative and qualitative control of raw material during all stages of production.
2. Knowledge of outlets for the product.

Counterpart for Public Education: Educating the youth and adults of a community to live as good citizens in our society, preparing them to exploit their individual interests and aptitudes with full utilization of their abilities, requires:

1. Quantitative and qualitative selection of persons during their participation in all phases of the educational program provided by the community's public school system.
2. Knowledge of what society needs to maintain its economic and social progress with a properly developed citizenry.

Counterpart for Public Vocational Education: Educating and training selected youth and adults in areas of instruction which they need, want, and can use to make a living that will enable them to live up to acceptable standards of good citizenship, requires:

1. Quantitative and qualitative selection of persons to insure matching of training and education with individual aptitudes in keeping with employment requirements.
2. Functional skill and knowledge of the practical needs of people at work.

A good report card is not so much a reflection of the past as it is a prediction of the future. — *Arthur Swanson*, principal, Rockford, Ill.

The 1949 all-accident death rate was 61.2 deaths per 100,000 population. This is the lowest rate on record. — *National Safety Council.*

What The Secondary Schools Should Do

VICTOR MILLONZI
Edison Vocational and Technical High School
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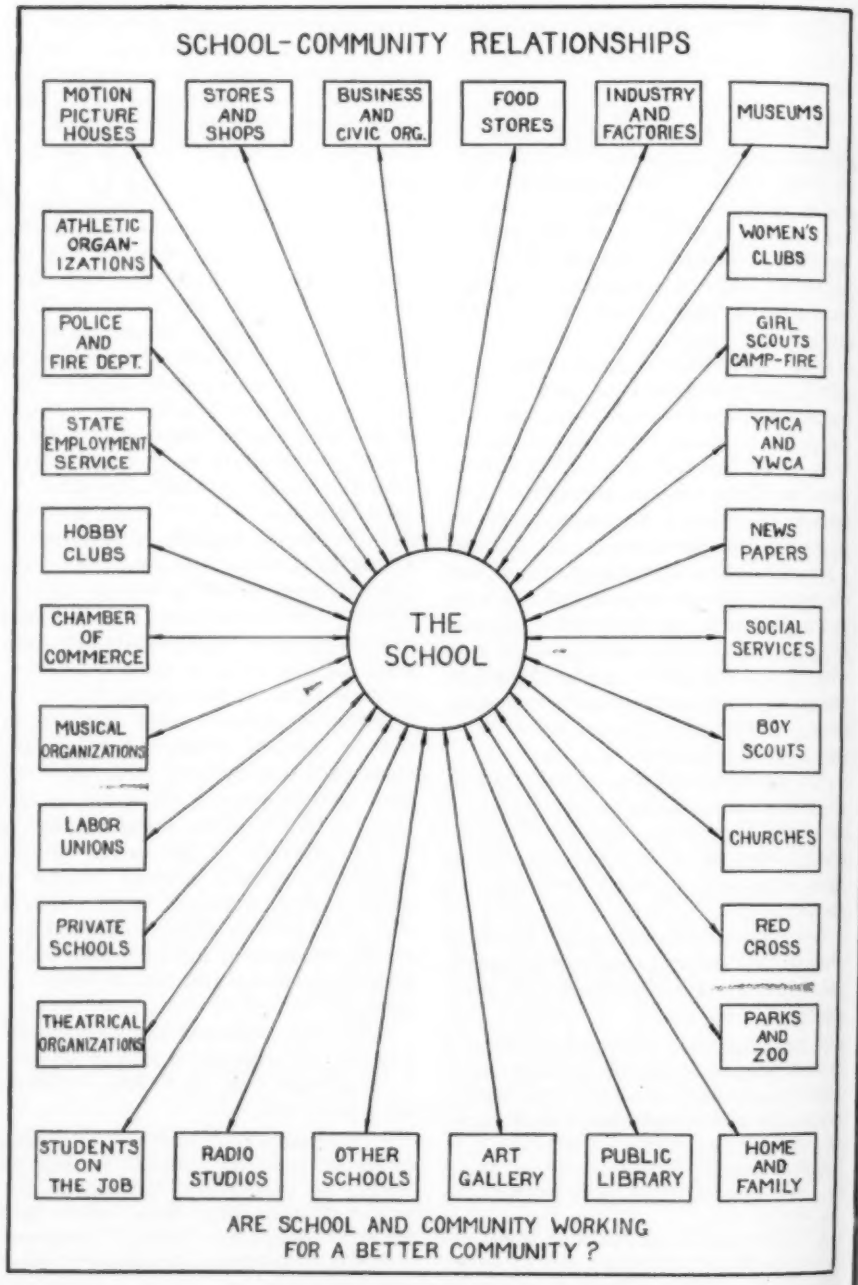
Secondary schools should adopt the concept that there is no occupation for which we cannot prepare our youth. This will require developing a curriculum that is flexible enough to provide for adjustments. It will mean teaching things that have to do with today — not yesterday. It should create situations that touch the pupil's life.

Such a curriculum should have and provide for:

1. An adequate program of co-ordination with all schools and facilities in the community as well as with various educational phases of the school program.
2. No artificial barriers in educational admission requirements.
3. Planned routine occupations for low-level groups to be built up to better occupations. This plan for co-ordination does not omit low-level intelligence.
4. A live-wire placement service which will not only place students on jobs but will follow up on the job to see what the school failed to teach, to offer advice on advancement, suggest courses in correspondence or private schools. A plan for job conferences each semester is desirable.
5. A wide variety of exploratory courses with adequate vocational information. These should approximate or duplicate life situations and permit changes in fields.
6. A continuous investigation of curricular needs carried on by a staff assigned to occupational research in new trends and occupations.
7. A year-round curriculum for all pupils which includes a common meeting place in the school. This makes for social maturity with no social frustrations. Social facilities should include a swimming pool, dance floor, cafeteria, club rooms, safety and medical department to teach fitness for jobs in terms of physical ability and emotional stability.
8. Realistic social studies which include: mental hygiene, child care, preparation for parenthood, trade-unionism, working conditions, hours and wages.



School and community relationships

9. A faculty of socially adjusted people with trade experience that leads to teaching.
10. A well-equipped central visual aids department.
11. A healthy student-teacher relation-

ship which includes student participation in planning techniques and administration. This is given on a rotating monthly plan so that it includes all pupils.

When leaving school our youth should:

1. Be able to cope with the problems growing out of the community and the world.
2. Be competent with skills to make a living doing something that society can use and be able to live on the income they will produce.
3. Be at home on his job by using the skills he has been taught in school.
4. Be competent members of society and their own families.
5. Be permitted to take post education courses.
6. Feel that he not only has skills for their own sake, but that they are important in daily life experience in a democracy.

Industrial-Arts Clubs

J. M. MILLIGAN, JR.
Terrell High School
Denison, Tex.

General education has three principal aims and objectives: (1) to transmit a way of life; (2) to improve that way of life, the most feasible method being by training for effective critical thinking; (3) to meet the needs of individuals in the basic aspects of living. An analysis of the American way of life indicates that it is highly industrialized, technical, and scientific; therefore, some subject pertaining to industrial arts must be included in the schools to orient youth to living in this highly industrialized society.

A century ago, a young man had his choice of only a few hundred occupations — today, he must make his selection from some 21,500 different jobs; therefore, he needs accurate, up-to-date information about those possibilities.

The Responsibility of the School

The school as a whole, centered around industrial arts, must assume the responsibility for giving the students this information. But, it is amazing to realize that so few people know the meaning of industrial arts, or its objectives. Superintendents, principals, and teachers still refer to industrial arts as manual training, or shop, or any number of names. There is an old saying which still exists, "Oh, he or she can't learn, send them to the shop." However, this is a compliment to the industrial-arts instructors. It shows that they are able to finish a seemingly hopeless job. This brings to our minds that knowledge of industrial arts, meaning skills and objectives, is very meager. If the school and teachers don't know too much about it, one cannot expect the community as a whole to know.

The responsibility of selling their programs to schools, industry, and community, therefore, rests upon the shoulders of industrial arts and vocational teachers. First however, the industrial arts and vocational teachers themselves must be sold on the idea, then we may sponsor a successful program. One sure method of achieving these objectives is through organization.

Industrial-Arts Clubs

I submitted a "Proposal for the organization of clubs for boys and girls enrolled in the trades and industrial classes, local and state, also regional," to the schools in our district. This proposal was accepted and quite a number of Industrial-Arts Clubs, or I.A.C. were organized, becoming a part of the county and district meets, the same as the literary and athletic organizations. I.A.C. is closely related to shop organization and the two work hand in hand, thereby giving the students the responsibility of developing a successful industrial-arts program.

Even though the making of projects, or completed jobs is not the main objective, it does serve a good purpose. Each year we have open house, and the industrial-arts department is open for inspection by the community. The work of the students is put on display, as well as the work of the vocational class in the building trades, which usually consists of a small home, built by the class.

Pictures of the different jobs completed by the vocational class are published in the daily newspapers. And at least two articles a year are submitted to the newspaper concerning different phases of industrial arts. We are fortunate to be able to sponsor two 15-minute radio programs a year. Our first program was entitled, "*Introducing the Industrial Arts Department to the Community.*" It consisted of the following:

A. The evolution and definition of terminology currently used in vocational and practical-arts education

B. Aims and objectives of vocational education

C. Guidance in our industrial-arts shops

The second program was entitled, "Introducing the I.A.C. or the industrial-arts clubs to the Community," and consisted of:

A. (1) Organization — Introduction of officers and members (2) Aims and objectives

B. Better craftsmen

C. Improving the industrial arts

Public Relations

Industrial arts and vocational education depends on good public relations; every instructor of industrial arts should be concerned about making the public relations surrounding his training program the best possible.

At our district meet, which consists of field, track, and literary events, we also have industrial events or participation. Projects are entered, from the different schools, according to grades and type of work, and individual students also participate in the contest. The winners are given awards the same as any other participants in any event, and a pennant is given to the school receiving the most points in the industrial, vocational division.

All of this adds up to: (1) better workmanship, (2) citizenship, (3) sportsmanship. By making the courses alive and challenging the students look forward to their time spent in the shop, and greater creative zeal is stimulated in them. Then, too, another opportunity is given them to learn how to get along with others. The project also helps to build within the youth a feeling of self-confidence that assists him in solving his own problems later in life.

In conclusion, it must be emphasized that the success of shop organizations, clubs, and industrial and vocational education is dependent upon the existence of or development of the right attitude toward it, and there must be made a continuous effort on the part of the instructors and the students to maintain this attitude.

Disabled veterans of five wars and the Regular Establishment were on Veterans Administration disability compensation and pension rolls on May 1, 1950. Civil War veterans numbered 15; Indian Wars, 542; Spanish-American War, 93,484; World War I, 511,679; World War II, 1,699,701, and the Regular Establishment, 531,120.

Mobile Unit Workshop Goes to Rural Schools

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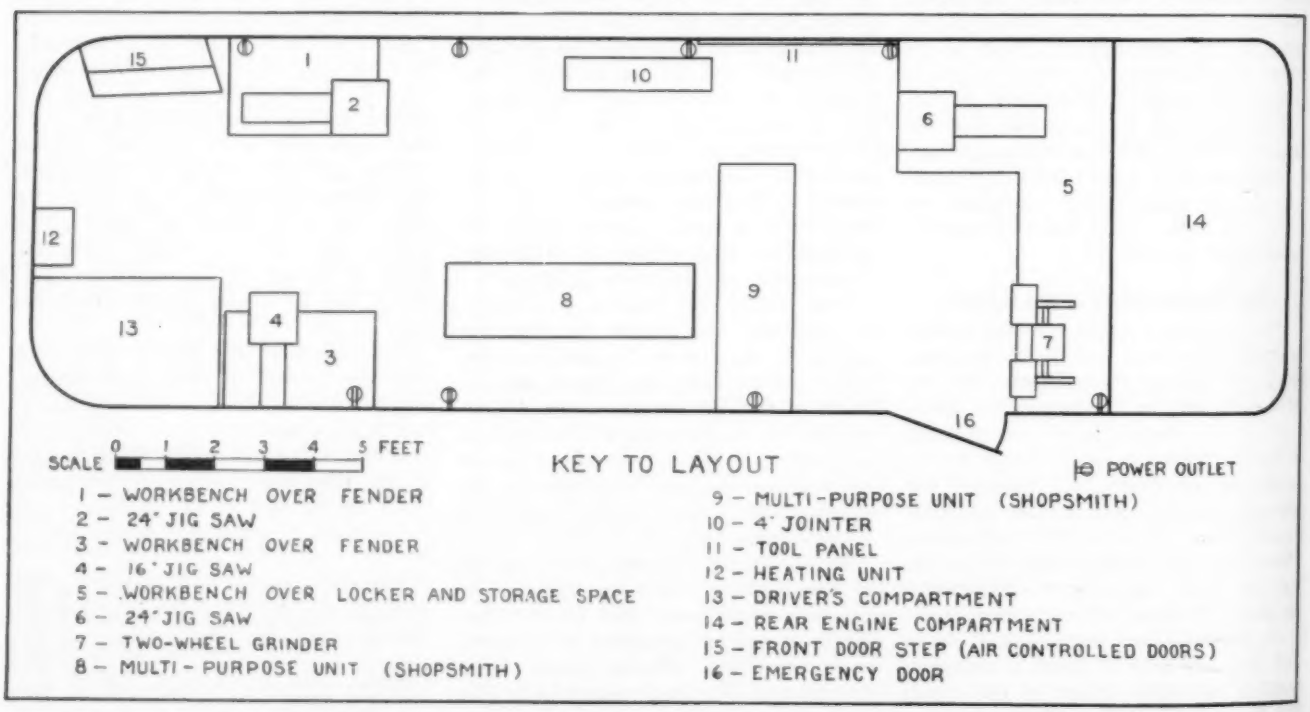
Provide complete *power* workshops for the smallest rural schools? It has seemed difficult if not impossible though it has long been the dream of many industrial-arts educators. A new mobile shop unit, developed in California by the Santa Clara County School Department, provides a solution to this problem which can be adopted by many school districts.

The four smallest schools served by this unit have 13, 16, 29, and 41 students, respectively. Yet for at least a portion of one day each week, students at these schools are enabled to use a power workshop which provides one 4-in. jointer, four jig saws, one two-stone grinder, and two Shopsmith multipurpose units. Each of the Shopsmith units can be converted by the instructor, as required, into an 8-in. circular saw, 33-in. wood lathe, 12-in. disk sander, vertical drill press, horizontal drill press, jig saw, drum sander or shaper.

The workshop visits a rural school

All of this equipment fits neatly into a retired commercial type bus which was reclaimed for a modest price from a local dealer. The fact that so much equipment can be fitted into such a limited space is largely a result of the compactness of the Shopsmith units, each of which adds


SCALE 0 1 2 3 4 5 FEET
KEY TO LAYOUT
POWER OUTLET
1 – WORKBENCH OVER FENDER
2 – 24" JIG SAW
3 – WORKBENCH OVER FENDER
4 – 16" JIG SAW
5 – WORKBENCH OVER LOCKER AND STORAGE SPACE
6 – 24" JIG SAW
7 – TWO-WHEEL GRINDER
8 – MULTI-PURPOSE UNIT (SHOPSMITH)
9 – MULTI-PURPOSE UNIT (SHOPSMITH)
10 – 4" JOINTER
11 – TOOL PANEL
12 – HEATING UNIT
13 – DRIVER'S COMPARTMENT
14 – REAR ENGINE COMPARTMENT
15 – FRONT DOOR STEP (AIR CONTROLLED DOORS)
16 – EMERGENCY DOOR

Mobile shop unit, Santa Clara County School Department floor plan

A student of a rural school who now has an opportunity to get the type of shopwork his city cousins get in their schools

greatly to the flexibility of the shop but occupies only 18 by 60-in. floor space. Eight students can work in the bus at one time, and there is ample space around each work station.

This mobile unit does not provide hand woodworking facilities. Its purpose is to supplement the small hand woodworking shops with which most of the schools in Santa Clara County are equipped, and bring them for one day a week at least, some of the advantages of "big city" school shops. Through demonstration and training, pupils are taught to respect the value and use of each type of power equipment represented. They are then permitted to use the power tools when their projects require such equipment, but they do a large part of their work with hand tools in their own school shops. In this way the value of experience with power tools is spread over a maximum number of students. Students in these rural schools regard an opportunity to use the power equipment as an opportunity well worth striving for — something akin to a meeting with Joe Di Maggio or a trip to the World Series.

Four part-time industrial-arts instructors operate the unit. All are paid by the school districts they serve although they are under the supervision of the Santa Clara County School Department. Two of the four are graduate students in industrial arts at San Jose State College. All have teaching certificates and they bring to their work a high degree of enthusiasm which has had much to do with the success of the project.

In addition to producing an almost immeasurable increase in student interest in industrial arts by giving them an opportunity to work with this equipment, the new unit has helped instructors by providing power tools for preparation of stock. The quality of the work produced in the small rural shops has improved markedly. This is probably as much due to the increased enthusiasm of students and instructors as it is to the additional equipment provided.

By no means the smallest benefit derived from the unit has been the assistance it has provided in advancing the cause of industrial arts in Santa Clara County. School administrators, once discouraged by lack of equipment and generally lacking in enthusiasm about the addition of industrial-arts courses in their schools, are now competing with each other to obtain more frequent visits from the mobile unit. The enthusiasm of the students has proved to be contagious in enlisting the support of parents, school board members, and other civic groups. There is reason to believe that many schools will eliminate themselves from the group requiring the services of the mobile shop by acquiring adequate facilities of their own. By thus eliminating itself, the mobile unit will serve its highest purpose in the minds of its creators.

Problems of the Beginning Industrial-Arts Teacher

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It is not uncommon for industrial-arts teacher-educators to speak of a graduating senior in glowing terms. The description often takes the following form, "He will make an excellent teacher — he can make anything!" If a person is to teach in a subject field which makes use of wood and clay, and is proficient in the use of tools to work these media, then it logically follows that he will be an excellent teacher. What could be more simple? According to this reasoning it would be safe to assume that such a teacher would experience no unusual problems in his teaching.

Many industrial-arts people realize that excellence in technical skills is not the only criterion by which a good teacher is judged. We still have among us, however, those who labor under that misconception. In this study of the problems of the beginning industrial-arts teacher, it became evident that beginning teachers themselves, minimize the role of technical skills almost to the point of exclusion.

The purpose of this investigation was to

bring to light some of the problems that the industrial-arts teacher experiences in his first year of teaching. The problems to be considered were not only those encountered during the school day, but also those that occur after school hours as a result of the person being a teacher. Obviously this would include problems that arose in personal-social living as well as in professional situations. A question may arise in the reader's mind as to the *why* of including the former type of problem in the study. It was felt that a teacher might conceivably experience problems in his personal life that would affect him in his professional duties. Only one teacher listed a problem in this area, however, and it was the currently present problem of inadequate salary.

The data were obtained by interviewing 16 industrial-arts teachers, 2 supervisors of industrial arts, and 2 principals having industrial-arts teachers under their supervision. These numbers are few but the purpose of the study was to obtain symptoms rather than to make complete diagnosis. Inasmuch as these people were interviewed, sometimes more than once, the results are thought to be more valid than an extensive study by less direct means.

The participants, as a rule, named two or three problems which they considered to be outstanding. The schools in which the participating teachers taught, were located in a large city and also in suburban areas. In terms of the socioeconomic status of the pupils, the schools ranged from very high to low. One school is located in a notably wealthy county, while another school is located in an urban *blighted* area.

When tabulated, the problems as stated by the participants grouped themselves under three large headings: (1) problems related to pupil relationships, (2) problems related to routine school duties, and (3) problems related to physical facilities and equipment of the industrial-arts shop.

Problems Related to Pupil Relationships

In this category the responses showed motivation, discipline, and evaluation as the problems of greatest magnitude. Three of the teachers, unable to classify their problems, frankly stated, "I don't understand children."

It seems particularly significant that teachers recognized discipline and motivation as factors underlying other problems. What is more significant is that these teachers are concerned with human relationships — and not only with subject matter. Seven of the people included in the investigation stated that the motivation of pupils was one of their outstanding problems. Most of the teachers distinguished between pupil interests and teacher-motivated learning. The statements of the teachers ran to the effect that, the pupils seemed interested and motivated only when pursuing their own interests. When the teacher attempted to guide the learning activities into channels that would result in attaining alleged industrial-arts objectives, the pupil-interest waned. The specific problem was that of stimulating pupil-interest in learning activities that would serve as a vehicle in satisfying objectives.

Discipline proved to be a problem to five of the people interviewed, including two supervisors. Comments on this problem were such as these, "The children don't know how to work in groups, they all want to be the center of attraction." "The children have no respect for the teacher." When given further thought, the comments in many instances reflected the developmental tasks of adolescence. If teachers do not recognize the manifestation of these tasks, how can a child be expected to attain such objectives as, "to develop desirable personal-social traits"?

Many of the teachers appeared to think that discipline exists as a pure thing, and not as a result, or cause, of other factors. When asked how they coped with discipline problems, the teachers gave answers that indicated they were treating results and not causes.

To two teachers and two supervisors evaluation proved to be a problem of some importance. The problem actually assumed two forms: (1) a lack of knowledge as to the evaluative procedure, or policy, held by the school system, and (2) how to evaluate growth other than skill in handling tools.

Of the two supervisors, the principal alone was sensitive to the fact that there are skills, other than those of a manipulative nature, that should be evaluated. The supervisor who was a specialist in industrial-arts education gave no indication that he considered social skills and qualities of thinking as worthy of being evaluated. Is this indicative of a tendency of industrial-arts educators to minimize all but manipulative skills? The sampling of this investigation is not sufficient to present an answer to the question, however, industrial-arts people could well ask it of themselves.

The people involved in the study were unanimous in their recommendations for overcoming the problems grouped under pupil relationships. In their opinion the teacher education institution could supply course work, or controlled experiences that would enhance an understanding of children. None of the supervisors, however, suggested means of incorporating such experiences in an in-service program for teachers. A few of the teachers further recommended the student-teaching period as an ideal time for experiences in child growth and development.

Problems Related to Routine School Duties

In this area fell those problems that could be most easily overcome because of their concreteness.

The problem voiced by six of the teachers and one supervisor, was that of lacking an understanding of the multitudes of clerical records to be kept. When questioned further, the teachers indicated that the more perplexing forms were the cumulative records, and other similar forms used for guidance purposes. The problem was not that of being burdened with the task of making the necessary entries, but rather, of not knowing how, and when, to make the entries.

Related specifically to industrial arts was the problem of requisitioning. The teachers stated that they were lacking in "know-how" in actually making the requisition, and in anticipating their needs for a semester or year in advance. A minor facet of the problem lay in the fact that the teachers were given little, if any, instruction as to the amount of money to be expended, and the proper time for presenting the requisition.

As regards clerical records, particularly the guidance forms, the teachers suggested that the teacher education institution could give instruction in broad purposes of the cumulative record, and the types of entries usually made on the record. To do this specifically for each school district that an institution serves, was realized to be difficult, if not impossible. Instruction in the proper requisitioning techniques was thought by the teachers to be a function of the teacher education institution, with incidental instruction in the methods peculiar to the school system being supplied by the supervisor. Other methods suggested were: the use of a handbook, issued by the school district, containing pertinent information on the routine duties, the *helping teacher* technique during a short orientation period, and a preservice conference at which time all routine duties would be described in detail. These methods were to be employed by the individual school systems.

Problems Related to Physical Facilities and Equipment of the Industrial-Arts Shop

In this category the teachers stated only one problem that concerned them.

The problem was that of finding tools and machines in poor condition, and materials in a depleted state. A significant point is that while six teachers stated this to be a problem of major concern, not one supervisor considered it such. If these supervisors had had the opportunity to listen to the teachers' reasons for listing this as a problem, they would have been more than mildly surprised.

The tools were not only in need of repair, but in some cases it was reported that there were insufficient tools for pupil use. The teachers, upon being pressed for a *why* as to physical facilities presenting a problem, felt that it lowered morale and affected their teaching. Is morale a concern of the industrial-arts supervisor? This is a purely academic question — it needs no answer. A number of reasons are possibly the cause for beginning teachers stating that the poor state of repair as to tools and materials is a problem to them.

The supervisor should bear in mind that many of the recently graduated industrial-arts teachers wear the figurative rose-colored glasses. These beginners probably feel that an industrial-arts shop (previously inhabited by an overworked teacher and adolescent children) will be in the same good condition as that of the teacher-education institution from whence they have just been graduated. Another possible reason is that for the first time the teacher sees evidence of the fact that he must work within the confines of a budget. He does not find all of the equipment that he thought was *standard* in an industrial-arts shop. In many instances the teacher probably appraised the situation rightly — the shop *was* run down.

As a corollary to this investigation the teachers were requested to give expression to ways in which the situation, as regards physical facilities, could be remedied. One solution as given by the participants, was to have the supervisor tell the prospective teacher the full details of the condition of the shop and of the funds available for its development and rehabilitation. At this point it is pertinent to add that all six of the teachers had been given no specific information as to the condition of the shop that they were to enter. A second solution suggested, was for the supervisor to show the prospective teacher the shop so that he might plan an effective program with the facilities at hand. In all cases the teachers felt that the supervisor should state the policies, possibilities, and procedures for bettering the facilities of the laboratory.

The suggestions given by the teachers, as regards physical facilities, indicates that they are sensitive to the fact that any shop needs the time of the teacher to bring it up to a good working level. This is particularly true in the first year that a person teaches.

Problems Regarding Curriculum

This area is included here only because it proves to be provocative when analyzed, and not because of the number of teachers listing it as a problem area. Falling in this category are such items as formulating industrial-arts objectives, and deriving curriculum content.

While only three teachers felt that some item in this area constituted a problem, all four of the supervisors were of the opinion that this was a problem area. This brings a number of questions to mind which this investigation will not attempt to answer:

Are beginning industrial-arts teachers insensitive to curriculum problems?

Are supervisors overly conscious of curriculum problems?

Are supervisors too sensitive to curriculum problems that they overlook other problems which the beginning teacher may have?

It can readily be seen from the data presented, that the teachers interviewed gave no indication of the lack of technical skills as being a problem. The problem to which these teachers were sensitive was that which impeded them most. One overwhelming problem may have obscured all others. It is safe to say, however, that these teachers were confronted with problems which directly, or indirectly, affected their teaching to such a degree that they felt they were not doing as good a job as could be done.

The patterning of problems has implications for supervision. By analyzing the problems of his beginning teachers a supervisor can plan an effective program. When the teachers' problems are moving toward solution morale will rise, and instruction will also be improved.

The teacher education institution can also profit by studying the problems of the beginning teacher since there is a tendency for both the harassed beginning teacher, and the dissatisfied supervisor to place initial blame on the institution where the teacher's preparation was made. Condition teachers for their first teaching job.

Industrial-Arts Teachers in Wisconsin Public Secondary Schools

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Introduction

The demand for adequate teachers' salaries will ultimately need to be matched with a commensurate level of professional competence. This observation should not be construed to mean that less stress should be placed on teachers' comparatively unfavorable economic status, but rather it is intended to emphasize the obligation which accompanies the improvement of any group of professional workers. When public school teachers are paid an annual salary which will not only keep qualified teachers in the profession, but will also attract a fair share of the more desirable high school graduates, the public will be justified in demanding that teachers maintain high professional standards.

It is not within the scope of this paper to identify all of the factors which affect the professional status of secondary school teachers. The following eight elements do, however, lend themselves to a fairly objective treatment:

1. Summer school attendance
2. Professional training
3. Membership in professional organizations
4. Subscriptions to professional magazines
5. Purchase of professional books

6. Expenditures for professional books
7. Total teaching experience
8. Certification

While the primary theme of this article will be to indicate the professional level of Wisconsin industrial-arts teachers, a secondary one will be to make comparisons between this group of teachers and two other groups: (1) a sample of both men and women teachers in the state; and, (2) all men teachers in the sample.

The Sample

The original data for this article were obtained in a study of the professional personnel of Wisconsin public secondary schools.[1] In this investigation unsigned questionnaires were received from 3788, or 49.8 per cent of the high school teachers and principals in the state. Every one of the 71 counties was represented, as was no less than two out of every five high schools. The sample also closely approximated the proportion of men and women teachers, and the distribution of teachers according to number on the faculty.

Returns from industrial-arts teachers were selected from this larger sample and totaled 235, or 54.7 per cent of all industrial-arts teachers listed in the Wisconsin Official School Directory for 1946–47. On a geographical basis, this number represented 51 out of a possible 58 counties. Thirteen counties do not have a single industrial-arts teacher. The 235 industrial-arts teachers analyzed in this study are also included in the larger sample of all high school teachers and principals in the state.

Summer School Attendance Since First Teaching Assignment

Teaching in the public schools is a dynamic profession. Good teachers are aware of the importance of keeping up with new developments and techniques of instruction. Periodic attendance at summer school meets this need for many. Some schools systems have mandatory provisions which require summer school attendance at regular intervals. It is of interest to note in Table 1 that more than 80 per cent of the industrial-arts teachers in Wisconsin have attended summer school since their first teaching assignment. This proportion exceeds that for the other two groups being compared as follows: All teachers had 72.1 per cent summer school attendance while all men teachers had 73.4 per cent.

[1]Stuart A. Anderson, "A Study of the Professional Personnel of Wisconsin Secondary Schools with Special Reference to Extra-contractual Income," Unpublished Ph.D. Thesis, The University of Wisconsin, 1948, 278 pp.

TABLE 1. Summer School Attendance Since First Teaching Assignment

	Ind.-Arts Teachers		*All Teachers*		*All Men Teachers*	
Status	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Yes	187	80.9	2578	72.1	1280	73.4
No	44	18.9	995	27.9	463	26.6
Total	231	99.8	3573	100.0	1743	100.0

Professional Training

While certification for high school teaching is quite generally predicated on four years of professional training, it may be seen in Table 2 that 7.4 per cent of the industrial-arts teachers in Wisconsin had less than the baccalaureate degree. Nearly one-fourth held a bachelor's degree. About half, 45.2 per cent, had taken some work beyond this first degree, as compared to 35.9 per cent for all teachers and 37.5 per cent for all men teachers. Approximately 14 per cent of the industrial-arts teachers, as well as all men and women teachers, held the master's degree; while 18.5 per cent of all men teachers had this advanced degree. Work beyond the master's degree included only 8.2 per cent of the industrial-arts teachers as compared to 15.3 per cent of all teachers, and 17.2 per cent for all men teachers. In summary, it may be stated that the level of professional training of industrial-arts teachers in Wisconsin was somewhat below that of all men and women teachers, and of all men teachers in particular.

TABLE 2. Professional Training

	Ind.-Arts Teachers		*All Teachers*		*All Men Teachers*	
College Training	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Attended, but did not graduate	17	7.4	164	4.6	55	3.2
Bachelor's degree	56	24.3	1084	30.2	428	24.6
Work beyond bachelor's	104	45.2	1288	35.9	652	37.5
Master's degree	34	14.7	500	14.0	332	18.5
Work beyond master's	19	8.2	544	15.2	280	16.1
Ph.D. Ed.D.	0		5	0.1	2	0.1
Total	230	100.7	3585	100.0	1739	100.0

Membership in Professional Organizations

Membership in professional organizations was held by practically 94 per cent of the Wisconsin industrial-arts teachers as may be seen in Table 3. This proportion compares favorably with the larger sample of men and women high school teachers who claimed 94.2 per cent membership, and all men teachers with 93.2 per cent.

Subscriptions to Professional Magazines

A large majority of industrial-arts teachers, 86.7 per cent, reported that they had subscribed to one or more professional magazines during the school year as may

TABLE 3. Membership in Professional Organizations

	Ind-Arts Teachers		*All Teachers*		*All Men Teachers*	
Status	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Yes	216	93.9	3358	94.2	1621	93.2
No	14	6.1	205	5.8	119	6.8
Total	230	100.0	3563	100.0	1740	100.0

be seen in Table 4. This record is even more impressive when compared to all teachers who had 83.6 per cent; and all men teachers, with 82.7 per cent.

Professional Books Purchased During School Year

The purchase of professional books — along with summer school attendance, membership in professional organizations, and subscriptions to professional periodicals — may be considered as objective evi-

TABLE 4. Subscriptions to Professional Magazines

	Ind.-Arts Teachers		*All Teachers*		*All Men Teachers*	
Status	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Yes	202	86.7	2952	83.6	1420	82.7
No	31	13.3	580	16.4	298	17.3
Total	233	100.0	3532	100.0	1718	100.0

dence of professional status. Nearly 70 per cent of Wisconsin industrial-arts teachers had purchased at least one professional book during the school year, as compared to 61.1 per cent of all men teachers, and 57.9 per cent of all teachers, according to the data presented in Table 5.

TABLE 5. Professional Books Purchased During School Year

	Ind.-Arts Teachers		*All Teachers*		*All Men Teachers*	
Status	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
Yes	161	69.4	2070	57.9	1066	61.1
No	71	30.6	1508	42.1	679	38.9
Total	232	100.0	3578	100.0	1745	100.0

Expenditures for Professional Books

An analysis of the amounts spent for professional books during the school year reveals further difference in the professional status of these three groups. Industrial-arts teachers were high with a median expenditure of $10.55, followed by men teachers with $9.20, and all men and women teachers with $8.36, as may be noted in Table 6.

Teaching Experience

The teaching profession becomes stabilized largely to the extent that individuals who enter this employment make it their lifework. In Table 7 it may be observed that the average teaching experience for all teachers was slightly more than 15 years. The mean for all men teachers was 14.7 years, as compared to 17.6 years for industrial-arts teachers.

TABLE 6. Expenditures for Professional Books

Amount Spent	Ind.-Arts Teachers Number	Ind.-Arts Teachers Per Cent	All Teachers Number	All Teachers Per Cent	All Men Teachers Number	All Men Teachers Per Cent
$ 5 or less	29	18.1	568	27.2	231	21.4
6–10	56	35.0	708	33.9	369	34.1
11–15	47	29.4	388	18.6	241	22.3
16–20	9	5.6	148	7.1	83	7.6
21–25	14	8.7	123	5.9	71	6.6
26–30	0	...	37	1.8	21	1.9
31–35	2	1.3	26	1.2	15	1.4
36–40	1	0.6	24	1.1	14	1.3
41–45	0	...	6	0.3	4	0.4
46–50	2	1.3	31	1.5	19	1.8
51–100	0	...	25	1.2	10	0.9
100–150	0	...	4	0.1	3	0.3
Total	160	100.0	2088	100.0	1081	100.0
Median	$10.55		$8.36		$9.20	

Certification

In Wisconsin the certification of public school teachers has been delegated to the Superintendent of Public Instruction. During the emergency, permits have been granted to a number of high school teachers who were not graduates of an accredited four-year college, or university course. According to the evidence presented in Table 8 more than 90 per cent of the industrial-arts teachers held a life certificate as compared to 80.2 per cent of all men teachers and 79.7 per cent of all teachers. However, one-year licenses were claimed by nearly 8 per cent of the industrial-arts teachers, as compared to more than 17 per cent for the other two groups. Special permits for substandard teachers were held by 2.1 per cent of the industrial-arts teachers, 2.4 per cent of all men teachers, and 2.8 per cent of all teachers.

TABLE 7. Total Teaching Experience

Years	Ind.-Arts Teachers Number	Ind.-Arts Teachers Per Cent	All Teachers Number	All Teachers Per Cent	All Men Teachers Number	All Men Teachers Per Cent
0–3	16	6.9	721	20.1	298	17.1
4–7	23	10.0	533	14.8	238	13.6
8–11	28	12.1	425	11.8	267	15.3
12–15	24	10.4	379	10.5	232	13.3
16–19	33	14.3	376	10.5	204	11.7
20–23	43	18.7	421	11.7	228	13.1
24–27	36	15.7	290	8.1	143	8.2
28–31	17	7.4	202	5.6	74	4.2
32–35	8	3.5	149	4.2	38	2.2
36–39	1	0.4	54	1.5	14	0.8
40–43	1	0.4	27	0.8	7	0.4
44–47	0	...	13	0.4	2	0.1
Total	230	99.8	3589	100.0	1745	100.0
Mean	17.57		15.18		14.70	

TABLE 8. Type of Teachers' License Held

License	Ind.-Arts Teachers Number	Ind.-Arts Teachers Per Cent	All Teachers Number	All Teachers Per Cent	All Men Teachers Number	All Men Teachers Per Cent
Permit	5	2.1	102	2.8	42	2.4
One-year license	18	7.7	633	17.5	305	17.4
Life certificate	210	90.9	2881	79.7	1410	80.2
Total	233	99.9	3616	100.0	1757	100.0

Summary

In summarizing this study of the professional status of Wisconsin industrial-arts teachers, it may be stated that this group ranked first in six out of eight factors selected for comparison. Only in level of professional training and in membership in professional organizations were they excelled. It is not within the scope of this report to determine causal factors which might explain these results. However, it does seem evident that this group of teachers in Wisconsin has attained a higher level of professional competency, in terms of the factors used in this investigation, than either the men teachers, or both men and women teachers.

A Project in Consumer Education—Buying A Home

WALTER L. AMBROSE
Instructor, Industrial Arts Department
Lincoln School
St. Louis, Mo.

If more prospective home buyers would make a closer observation of the home they are planning to purchase, they would probably be happier in the long run.

By using the form shown herewith we intend to teach students how to eliminate some of the many mistakes made in buying a home. When planning to purchase a house, it is always better to look at more than one house and later to compare the features of the various houses that have been inspected. With the use of the form shown, this can be accomplished easily.

This form gives the buyer an idea of what to look for and what to look out for. It saves time because of its directness. It acts as a permanent reminder and record, eliminating the need for repeat inspections. Armed with the form, the prospective home buyer will make a wise selection and a more advantageous purchase than he would have made without it.

A Few Fundamental Things to Look for as Prospective Home Buyers

Street..... Section.....
Price.....Size of lot: Frontage...Depth...
Owner or realtor.....Phone number.....
Location: Schools.....Transportation.....
Shopping..... Doctor..... Church.....
Hospital..... Fire protection.....
Type of Construction: English.....
Modern..... Ranch type..... Others.....
Materials of Construction: Brick, Wood, Concrete, Lustron, Aluminum, Stucco, Cement Block, Plywood, Others.....
Condition of exterior.....
Type of windows.....
First Floor: Number of rooms.....
Height of rooms.....Type of flooring.....
Type of walls.....Type of ceiling.....
Condition of walls and ceiling.....
Condition of floors.....
Lighting fixtures: Overhead.....wall.....
floor.....Direct or indirect.....
Size of living room..... x .....
Size of dining room..... x .....
Size of kitchen ..... x .....
Type of kitchen..... Breakfast nook.....
Toilet facilities.....
Plumbing (galvanized or others).....
Closets..... Cabinets.....
Extra rooms..... Hallways.....
Stairways (head clearance).....
Screens or storm doors.....
Window shades, blinds, and awnings.....
Porch Construction: Size..... Type.....
Grounds Landscaped:
Trees.... Grass.... Bushes.... Flowers....
Garage construction:
Size..... Material..... Access.....
Attached..... Separate.....
Second Floor: Number of bedrooms.....
Bathrooms.... Closets.... Storage space....
Ventilation .....
Condition of floors...of walls...of ceilings..
Size of bedroom No. 1 ..... x .....
Size of bedroom No. 2 ..... x .....
Size of bedroom No. 3 ..... x .....
Size of bedroom No. 4 ..... x .....
Attic size.....Finished or not.....
Insulated .....
Roof: Flat..... Gable..... Others.....
Shingle, metal, concrete, tile, Lustron, others .....
Chimneys..... Gutters and spouts.....
Notes: .....
.....
.....
Basement: .....Size..... Full or part....
Plumbing and sewerage..... Condition.....
Type of heating..... Condition.....
Fuel requirements per year.....
Size of coal bin.....
Fruit closets (storage space).... Wiring.....
Pipe ducts..... Exits to outside.....
Wood or steel beams.....
Condition of wood.....
Termite proofed..... Laundry facilities.....
Toilet or lavatory..... Window space.....
Concrete mix of foundation, if known.....
Age of building.....
General Information:
Assessed value.....G.I. appraisal.....
Tax rate..... Street assessments.....
Other incumbrances.....
Notes: .....
.....
.....

Sketches of Floor Plans

First Floor: Second Floor: Basement.

Industrial Arts and Vocational Education
John J. Metz, Editor

SCHOOL, OPENING DAY

The halcyon vacation days are drawing to a close and shop teachers must begin to look forward to their first meeting with the 1950–51 shop students. Veteran teachers have little fear of this ordeal. Years of experience have taught them what to do and what to avoid when they meet their new students, but there are many beginning teachers who must still acquire that experience.

Probably the first thing to emphasize is the establishment of the proper teacher-student relationship. Much depends on this. Students are sharp observers, and their first impressions may condition their future attitude and their behavior.

The first thing the students will observe when entering the school shop will be — or should be — the teacher. The next thing will be the shop itself. Both should make a good impression on them.

The teacher, therefore, should show a friendly attitude toward the students. Some of them may not be faultlessly attired; yes, they may even wear clothes and shoes that are not absolutely clean. The teacher, however, may not allow himself such liberties — he must strictly observe the rules of cleanliness, for the pupils will judge him by his appearance.

He must not let any of the students feel that because of their poorer clothing they are rated below some of their classmates who may be better attired. Above all, he must avoid giving them the feeling that he rates himself as being better than they are. They will freely admit that the teacher knows more than they do, but they have strongly imbibed the feeling that they are as good as he is.

His friendliness must under no condition give them the false impression that they can do anything they wish. They must learn at once that improper deportment will not be tolerated at any time. The young teacher must also learn that he must not bear a grudge against those who do not immediately fall into line. He need but remember his own school days when he, too, assisted his classmates to feel out the mettle of a new teacher.

As to the shop itself, that also should make a good impression by its cleanliness and orderliness. Some interesting material should be displayed on the bulletin board, and there should be some well-made projects on exhibition so that the students can at once see that here is a class where something will be done.

This first meeting presents an excellent opportunity for the teacher to sell himself and his subject. Full advantage should be taken of it. It also offers an excellent occasion to explain the objectives of the course, the method of testing and grading, and how each student's progress is recorded.

And then — the students must not be talked to death. If at all possible, they should be given their first demonstration. It should be snappy and to the point. Then they should be set to work. If it is impossible to give them actual shopwork that first day, some interesting related work that will give them a better insight into the tools and materials that they will use later on should be ready for them. This more or less academic approach is to be avoided, if possible.

For his own information, the teacher is referred to what Lafe Nelson lists as to what the qualities of a good teacher are. This list appears on page 296 of this issue. The new teacher also is referred to the article entitled "Problems of the Beginning Industrial-Arts Teacher," by Walter B. Waetjen, on page 263.

POINTS TO BE EMPHASIZED

Shop teachers may well ask themselves while yet there is time, "Have I planned something special to improve my teaching during the coming school year?"

This question requires a bit of retrospect, a delving back into the happenings of last year and of the previous years. What caused some of my failures? Can something be done about them? What changes in content and/or method must be made?

Having settled this question, there is another. What can be done to put more life into my course? Have I checked my work with the list of objectives that I so proudly display — or don't I? Have I, in the past, made my work so appealing to my students that they preferred it to other school work? Have I many discipline cases? Is my related work well developed, and have I tried to make it interesting to the student?

Do I emphasize safety in my shopwork? Do I teach my students how to maintain the tools in good condition? Do they know the value of a good tool, and why one tool costs $2.50, while a similar tool sells for $1.35?

Do I interest my students in owning tools of their own? Do I help them plan their home workshops? Is my school shop an example of good shop planning.

The foregoing presents a list that could be expanded much more, but the items mentioned are sufficient for a starter. If they can all be answered affirmatively by the shop teacher, he can rest assured that the school year 1950–51 will be quite successful as far as he is concerned.

There is another point, however, that is frequently overlooked by teachers, and that is the state of health of his students. The teacher must, of course, be concerned about his own health, but many of his pupils can be helped materially if some interest is shown in their health.

There is the boy who seemingly does not see well. Another lad has trouble with his hearing. Still another is continually troubled with colds. And then there is the boy who is always listless, does not want to congregate with others, seems to have no interest in anything.

Try to discover the reason for these symptoms, and, if possible, assist such students to get the right medical treatment while still there is time to correct the ailments. It is these altruistic endeavors of the teacher which attract his pupils to him, and it is these things that will draw forth, later on in life, expressions of regard and friendship that are so dear to a teacher's heart.

AN IMPORTANT OBSERVATION

Some subscribers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will not receive the September issue of this publication, simply because they did not notify our circulation department that they have changed their address.

Because of high costs, press runs are kept quite low, and we cannot replace lost copies.

Please notify us at once when you change your address, and be sure to include your zone number and your old address.

Some Leaders in Industrial Education

WILLIAM T. BAWDEN
Director of Publications
Kansas State Teachers College
Pittsburg, Kans.

(Continued from page 229 of the June, 1950, issue)

FRED CAMPBELL WHITCOMB (Concluded)

Outside Activities

Dr. Whitcomb's professional life was not confined to the campus of the institution he served so long and so well. He was in frequent demand for counsel, assistance, and services elsewhere; and often he used his vacation periods and leaves of absence in visiting and studying colleges and universities in all sections of the United States and abroad.

In 1915–16, he was appointed member of the staff organized by the U. S. Office of Education to conduct a survey of the public school system of Wilmington, Del. Dr. Whitcomb was in charge of the section of the survey concerned with a study of industrial plants and their needs for training programs for employed workers, a study of the industrial-arts program in the city schools, and plans for evening classes and an industrial-education program for the city.

In 1926, he visited Europe for the purpose of making an intensive study of vocational schools in France and England, with some time spent also in Belgium, Holland, Germany, and Scotland.

In 1937 and 1938, he spent much time in a study of practical arts in a number of colleges, universities, and teachers colleges in the middle west and far west.

From 1933 until his retirement in 1941, he was an active and influential member of the State Committee on Industrial Arts for Ohio.

He was a member of Kappa Delta Pi, international honorary society in education; Kappa Phi Kappa, national professional fraternity in education for men; and of Epsilon Pi Tau, honorary fraternity in industrial arts, of which he was made Laureate Member in 1937.

He was for many years active in Sigma Alpha Epsilon, social fraternity, serving as one of the founders of the chapter at Miami University, and faculty sponsor. He was also one of the founders of the chapter at Franklin College.

One significant honor has been bestowed upon him since his death, in the decision by the trustees to designate the industrial-arts building at Miami University the Fred C. Whitcomb Laboratory.

In Community Affairs

He always played a prominent part in community activities. He was for eight years superintendent of the Sunday School of the Memorial Presbyterian Church in Oxford, and for a number of years he was a member of the board of trustees of that church. From 1920 to 1926, he was a member of the Board of Public Affairs of Oxford, a period of considerable expansion in the village.

He served as president for one term, 1943–44, of the Fine Arts Club of Oxford. He was a charter member of the Oxford Kiwanis Club, always active in its affairs, and president for one term, 1940–41. Always interested in young people, he helped organize and conduct the Dog Show sponsored by the Oxford Kiwanis Club, in 1945.

From its inception, Dr. Whitcomb served as a member of the Community Recreation Board of Oxford. "His interest in the development of an adequate playground for children on the north side of town prompted him to build, almost singlehanded, the shelter house now in use."

"As a believer in all worthy causes, he, more than any other person in his neighborhood, regularly took the lead in such tasks as collecting funds for the Community Chest, the Red Cross drive, the Oxford Recreation Center, the Victory Bond drives during the war, and other civic and community projects. . . . He was noted for his courtesy and consideration for others. He was especially well liked by those who worked with him on committees for his willingness to assume major responsibilities, and the promptness with which he always did more than his share of the work."

Esteem of Colleagues

One measure of the achievements of Dr. Whitcomb at Miami University is found in the record of the impressions of a committee of his colleagues, who prepared and submitted a Memorial Tribute at a meeting of the Schoolmasters Club of Cincinnati, Ohio, in November, 1947. The men who drafted the Tribute were long-time personal friends as well as professional associates: Dr. Ernest James Ashbaugh, dean of the School of Education, Miami University, since 1929; Dr. Howard Forrest Vallance, director of the Bureau of Recommendations, School of Education, Miami University, since 1933, and director of the Graduate School, since 1947; and Dr. John Walter Hecker, head of the Department of Education from 1909 to 1928, and director of the Division of Elementary Education from 1928 until his retirement in 1945.

The statement is too extended to be reproduced here in full. Following are the significant passages:

"During his long service at Miami University he was ever on the lookout for new ideas. He visited not only the schools of this country but those of France, Belgium, Holland, Germany, England, and Scotland. He studied the practical arts programs of state departments of education, universities, and private schools. Any new venture in industrial education was sure to attract his attention. . . .

"Professor Whitcomb's philosophy of industrial education was thoroughly modern. He believed that effective learning must be purposeful, must therefore be based upon the learner's needs. The skills, he believed, are most readily acquired when the pupil is struggling with a project dear to his heart, and theory is best learned when it indicates the way to the chosen goal.

"His lifelong friend and associate, Professor Charles A. Bennett of the Bradley Polytechnic Institute, and Dean Herman Schneider of the University of Cincinnati, had much to do with the formulation of this philosophy. But he was also an ardent student of John Dewey, and of Frederick G. Bonser; and through an exchange of ideas with his co-workers at home and at an infinite number of conventions he formulated more fully the ideas which guided his thinking in industrial and general education.

"It was this philosophy, acquired through struggle with the current problems in industrial and general education, that enabled him to see the real significance of industrial arts in education for effective living, which gave him perspective as a teacher, as head of his department, as director of the Division of Practical Arts at Miami University, and as an inspector of schools and departments that sought his help.

"To appreciate Fred Whitcomb one must have known him intimately. He was a man of fine character, of strong convictions which could not be easily set aside, of tolerance for the views of others, however they might differ from his own. His fine sense of values, his reluctance to express an unkind opinion about anyone, his desire to be helpful to those about him whether students or colleagues, his eagerness to play his part in church and community life, his determination to see the good in mankind rather than its imperfections, his good fellowship on the bowling green or on a fishing trip made him not only a worthy citizen but a prized friend."

In May, 1947, Dr. William David Stoner, who has been a member of the faculty at Miami University since 1924, and who succeeded Dr. Whitcomb as head of the Department of Industrial Education, prepared a memorial statement from which I quote the following:

"Doctor Whitcomb devoted his professional life to education, and was a real pioneer in the field of industrial-arts education. . . . He was loyal and untiring in his services to Miami University and to his profession. He assumed responsibilities readily and performed those tasks assigned to him with efficiency and dispatch. He was tolerant and co-operative in his relations with colleagues and students. He will live long in the memory of his associates and students who profited greatly by his wise and sympathetic counsel.

"To those of us who knew him he stands out equally as man and educator. He was sincere, upright, modest, and just. He took an active part in the civic, social, and religious life of Oxford, and served with distinction in a wide variety of capacities the people with whom he lived."

His family and associates have reason to be proud of his professional achievements, of the uncounted friendships he formed, and of the high esteem in which he was held by all who knew him.

Personal Contacts

The earliest record I have found of Whitcomb's activities away from the University campus, which affords recognition of the leadership qualities that were beginning to manifest themselves, is a reference in the old *Manual Training Magazine* to an address on the subject of a proposed "State Course of Study in Manual Training," given at the annual meeting of the Ohio Art and Manual Training Association, in Cincinnati, November 10, 1911. Even before that date he had begun to make his influence felt, identifying himself with the National Education Association, the Ohio State Teachers Association, the Western Arts Association, and other organizations. He became a member of the old National Society for the Promotion of Industrial Education, which later became the present American Vocational Association. In these various organizations he was frequently called on for committee work, and thus quickly widened his circle of friends and acquaintances.

My first contact with Dr. Whitcomb was as a member of the Manual Arts Conference of the Mississippi Valley, which he attended for the first time at Bradley Polytechnic Institute (now Bradley University) in Peoria, Ill., December 4, 5, 6, 1913. This was the fourth meeting of the Conference, and the only one of the 36 meetings which have been held at which I was not present. That meeting was held during the period when I was a graduate student at Teachers College, New York, and unable to make the trip.

We met at the fifth meeting, which was held at the University of Chicago, November 19, 20, 21, 1914. I remember that we stayed at the old Del Prado Hotel, which has since been replaced by the International House of the University of Chicago. Built originally to furnish accommodations for visitors to the World's Columbian Exposition of 1893, the hotel was situated on 59th Street, two blocks west of the Illinois Central Railroad tracks, and just north of the Midway Plaisance, the amusement-concession section of the Exposition.

Whitcomb was quite regular in his attendance at meetings of the Conference, as the record shows he missed but one meeting from 1913 to 1941. Wartime restrictions on travel intervened, and the next meeting was held in November, 1946. At that time Whitcomb was unable to attend because of ill health, and death came the following month.

Dr. Whitcomb's first program assignment came at the seventh meeting of the Conference, which was held at Peabody College, Nashville, Tenn., December 7, 8, 9, 1916. Characteristically, he chose for the subject of discussion at the session over which he presided as chairman, "Problems of Practice Teaching." Again at the twelfth meeting of the Conference, held December 8, 9, 10, 1921, at the University of Michigan, Ann Arbor, he chose for his subject, "The creative impulse in industry — some implications for teachers of manual training."

In summarizing the discussion on this occasion, Dr. Whitcomb urged that the work in the industrial-arts shop should be organized and presented in such a manner that "pupils will enter into the work with all the zest which they manifest in taking kodak pictures or in building a wireless outfit at home. It is remarkable the enthusiasm and accomplishment achieved in such out-of-school projects. We must strive to get these values in our school work."

His last program appearance was at the 31st meeting of the Conference, held at the University of Missouri, Columbia, November 14, 15, 16, 1940, at which time he conducted a discussion of the topic, "Changing relations between industrial arts and vocational education."

He is remembered by his associates as reluctant to take issue with other speakers in a general argument if it could be avoided. At the same time, he would not hesitate to challenge a position that seemed to him indefensible, usually putting his objections in the form of questions, in a modest, almost deprecatory manner, in order not to give offense. He was always ready and willing, when his own position was challenged, to give his reasons clearly and succinctly, and usually they were convincing.

His attitude to the give and take of the discussions and arguments around the table was very well expressed at the 20th anniversary meeting of the Manual Arts Conference, which was held at Bradley Polytechnic Institute, Peoria, December 12, 13, 14, 1929, in the same room in which the initial meeting was held in November, 1909. Contributing to a symposium on "What the Conference has contributed to the development of my department," Whitcomb said, in part:

"This Conference has meant to me a forum for the discussion of projects and proposals, in which if a thing will 'hold water' I can feel confident that it may be considered sound."

A Teacher's Manual

I remember very distinctly the favorable reception given to the *Teacher's Manual,* copies of which he distributed to members at the 1940 meeting of the Conference. This was a mimeographed booklet of 86 pages, 8½ by 11 inches, the first of a series of *practical arts-work manuals,* designed to vitalize the professional aspects of teacher preparation, and particularly the work of

supervised student teaching in the laboratory schools of Miami University.

Intended to supplement rather than to replace the textbooks in use, the *teacher's manual* included chapters on the place of practical arts in education, determining the learning units, preparation and use of instructional material, physical aspects of shops and drafting rooms, shop-pupil organization, and professional interests of the teacher.

Indicative of the care with which the materials of the *manual* were assembled, and the thoroughness with which they were digested, it is worthy of note that Whitcomb and members of his department staff prepared a list of "practical activities" participated in by, or of interest to boys of junior high school ages. The activities were carefully analyzed and classified into 20 natural classes or groupings. The list was printed in the form of a questionnaire and submitted to approximately 1000 boys enrolled in junior high schools in cities and villages in southwestern Ohio.

After reading the descriptions designed to explain just what was meant by the various groups of "practical activities," such as play and sports, shacks and playhouses, pets, and the like, each boy was asked to indicate first, second, and third choices, based upon his own personal interests and needs. The tabulation of choices showed significant variations from teachers' conceptions of boy interests, as reflected in the activities included in the typical industrial-arts program. For example, the three "groups" of activities ranking at the top of the list are: play and sports, automobiles, and practical electricity.

"It is interesting to note that 'house furnishings' (tie racks, coat hangers, taborets, picture frames, bookshelves), the only unit of woodworking at present found in many schools, is ranked 11th (out of 20) in first choices, 10th in second choices, and 15th in third choices."

Help for the Junior High School Pupil

Following are some of the titles in the projected list of manuals designed for pupils in the junior high school:

How can I develop and maintain a home workshop?

How can I help make my home a better place in which to live?

How can I keep my farm and garden equipment in good condition?

What can I do toward keeping my personal possessions in good condition?

How can I keep records of my experiences and interests?

How can I develop a worth-while hobby?

How can practical activities help me in developing a broad social interest?

What amateur means of earning may I develop?

Another similar series of manuals was projected for senior high school pupils, but I have not seen the results.

Other Publications

In addition to numerous bulletins and pamphlets, prepared or edited by him, and published by Miami University, he was a frequent contributor to the professional journals. He will be remembered especially for a series of informative and constructive articles on "Industrial Education in Europe," consisting of detailed reports of personal observations while visiting schools in England, Scotland, France, Italy, Germany, Holland, and Belgium during the first six months of 1926. The articles were published in *Industrial Education Magazine*, in 1926, November; and 1927, January, March, July, and August.

Among the bulletins published by the department at Miami University were several monographs on various phases of industrial education and industrial arts.

In addition, Dr. Whitcomb was author of the following:

Industrial Education in Wilmington, Del. Report of a survey of industries, and of provisions for industrial education and industrial arts in the public schools. Bulletin, 1918, No. 25, U. S. Office of Education, Washington, D. C.

Cabinet-Making. A textbook in woodworking for secondary schools and colleges.

(With Others) *A Prospectus for Industrial Arts in Ohio.*

A Personal Touch

Dr. Whitcomb was a man of medium build; five feet eight inches, in height; and perhaps 145 to 150 pounds in weight. His manner was generally quiet and self-possessed.

With the aid of certain of Dr. Whitcomb's former students, it is possible to sketch in the outlines of a picture of a very human personality. According to these "authorities," he was generally associated on the campus with his pipe and his dog.

"He had a constant campus companion by the name of Pete, a small, brown, stub-tailed dog, of unidentified pedigree, who sat at his feet in his office, and in the classroom. One day Pete disappeared, and was never heard from again. Returning to Miami from time to time, we oftened remarked about Pete, and Prof said he certainly would like to know what might have happened to his pet."

From one source I learned that "most all of us called him 'Prof.' . . . I recall that a number of years ago, when I returned to Miami to enroll my daughter, Prof saw me in one of the restaurants smoking a corncob pipe. Prof came over to where we were sitting and said he had been trying to get some pipes, but without success. Upon my return home, I secured a half dozen pipes from a mail-order house in New York City, and sent them along. Upon receiving the pipes, Prof wrote and thanked me most generously. Prof surely loved those corncob pipes!"

Speaking for myself, I never saw Dr. Whitcomb's canine pal, but I well remember the smelly pipe he used to bring with him to meetings of the Manual Arts Conference. I always noted also his good-natured acceptance of the ribbing of his fellow members.

You will be impressed, as I was, by the following paragraph in a letter received from one of Dr. Whitcomb's former students. "While a student at Miami University I had a hard row to hoe financially. Prof learned in some way about my struggle, and, after the first six weeks' reports were in, he called me into his office to talk about my work. Among other things, he told me that my reports showed that I was one of his better students. This one remark took a big load off my mind, and gave me the needed courage to struggle harder, and eventually to win the two-year diploma. Prof was a real human being!"

This is the note upon which I would end this sketch. Fred Campbell Whitcomb was a modest, unassuming, considerate, and understanding friend to all who were fortunate enough to enter the charmed circle of his acquaintance.

Student built models. Photograph by Frederick Christoffel, graphic arts instructor, Cleveland Junior High School, Elizabeth, N. J. Submitted by J. Ely Van Hart, supervisor, industrial arts education, Elizabeth, N. J.

Industrial Arts in Detroit

EARL L. BEDELL
Divisional Director
Detroit Public Schools
Detroit, Mich.

To show the scope of industrial arts in the school shops of Detroit, an exhibit was prepared recently consisting of photographs made by the staff photographer of the department of visual education. These were mounted on a large bulletin board placed in the main corridor of the board of education building.

Those who visited this exhibit also were given a small folder containing the following explanatory statements. In this way parents and others were given an understanding of what industrial arts is, and what it purports to do for the youth of Detroit.

Extent of the Program

Industrial-arts education begins in the seventh grade in the elementary schools. It extends through the intermediate grades and is provided in all of the high school grades.

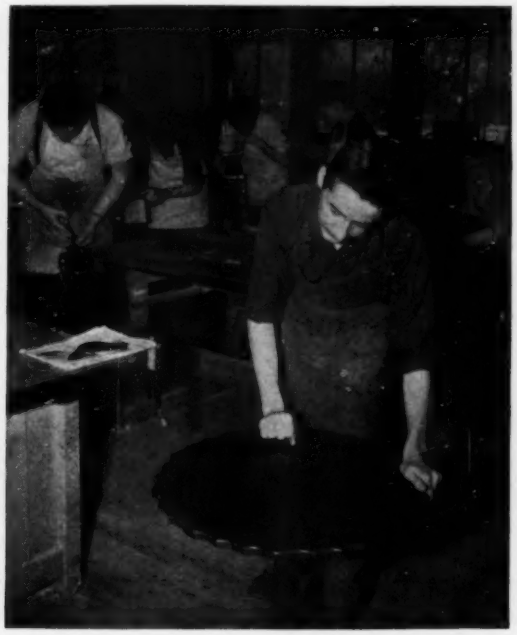
Metal spinning. Many beautiful and useful articles may be made by shaping sheet metal over wooden frames

Finished articles are the result of careful planning and painstaking work

Students are taught how to make minor repairs on home plumbing equipment

Many fundamentals of woodworking are eagerly learned in the construction of model yachts, airplanes, and similar projects

Learning the fundamentals of hand tool work



Polishing a table top. Several schools make fine pieces of furniture

What It Is

Industrial arts deals with the materials and processes in many industrial areas. This subject provides experiences which have both vocational and avocational value.

Many boys become interested in model airplanes, model boats, and craft work through the industrial-arts classes. These hobby activities are very valuable in directing boys in the worth-while use of leisure time. Also, the shop experiences give the boys considerable ability to do minor repair jobs around the home.

In the elementary grades the emphasis is on the avocational and general education values, while in the advanced courses in the high schools the vocational values are stressed.

How the Industrial Arts Are Taught

The industrial arts are taught as shop courses. The emphasis is on the processing of raw materials and the production of interesting and useful articles.

Projects may involve the use of such materials as wood, metal, plastics, leather, ceramics, finishing materials, electrical fittings, and a variety of attachment and assembly devices.

While it is natural that considerable hand skills will be developed, this is not alone the objective of the industrial-arts courses. The knowledge of the physical properties and use, characteristics of various materials and the accepted methods of handling, storing, and processing of materials of industry are equally important.

In the Detroit schools, all industrial-arts classes are organized on a pupil di-

Attention to details and careful planning are important qualities of good craftsmanship

Thousands of toys each year for underprivileged children are made in the elementary industrial arts shops to be distributed by the Junior Red Cross

The household mechanics shop provides training in many fundamentals necessary in the upkeep of the home

Cutting a helical gear on the milling machine

rected class management basis. Shop superintendents, record clerks, safety foremen, job foremen, and other pupil personnel co-operate in the class management. This pupil management provides another type of training, namely, leadership ability and the ability to take responsibility in directing others. Duties of these class personnel management officers are clearly defined and credit is given students for satisfactorily discharging these responsibilities.

The Exhibit

The photographs in this exhibit were taken in elementary, intermediate, and high schools. The selection is aimed to show the extent and variety of the program; however, there are many worthwhile activities which it is impossible to show in an exhibit of this size.

Comments and questions concerning the industrial-education program in the Detroit schools should be directed to the Vocational Education Department, 467 West Hancock, Detroit 1, Mich., TEmple 1–4204.

Ninety-seven per cent of drivers involved in automobile accidents in the U. S. in 1949 had at least one year's driving experience. — *The Travelers*, Hartford, Conn.

Three out of four traffic accidents happen in clear weather on dry roads. — *The Travelers*, Hartford, Conn.

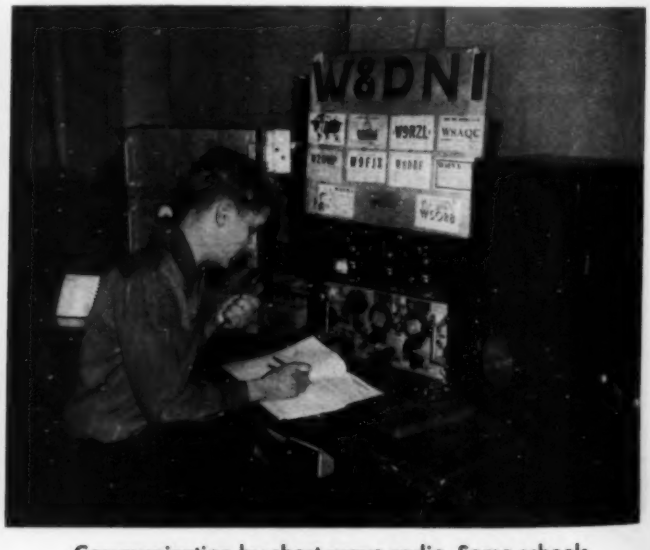
THE DEMONSTRATION

R. J. COLTHARP
Head, Department of Industrial Education
Memphis State College
Memphis, Tenn.

Teachers of manipulative activities frequently find many of their successes and failures to be in direct ratio to their ability to present an interesting and inspiring demonstration. Pupils are interested in the *how* as well as the *why* of procedures; the teacher who says "Do as I say, not as I do" is not making the maximum use of the psychological approach.

The immediate, as well as the remote, success of a demonstration is closely re-

The print shop in an intermediate school



Communication by short wave radio. Some schools have licensed broadcasting stations

lated to the pupil need. Just as the village blacksmith forges the metal when it reaches the correct temperature, so will the alert teacher present the demonstration to the group or class at the *critical* time. Lesson plans and schedules may call for demonstrations at 10:30 on Tuesdays and Thursdays, but pupil needs may call much more loudly for these demonstrations at some other time.

Before the need for the demonstration arrives, the forward-looking teacher will have analyzed the pupil activities and will have prepared himself by:

1. Rehearsing in private to satisfy himself of his ability to present a concise skillful demonstration.
2. Preparing a list of necessary tools (regular pupil tools, rather than a special teacher's kit) and materials. In many cases the practice of using pupil materials results in the instructor's using materials belonging to one of the more rapid workers; the material of the slower worker isn't quite ready for the particular operation being demonstrated; as a result, it is another version of "the rich get richer, and the poor get poorer."
3. Planning the demonstration in a special area, if one is available. Whether a demonstration area as such is available or not, the demonstration may well be presented near a blackboard, with all available visual aids readily at hand.

After these fundamental preparations have been completed, the instructor is then ready for the demonstration itself. In the presentation of the lesson, a number of key items may add or detract from the effectiveness of the presentation. Among these are:

1. The method of calling the group together — quietly, so as not to disturb those at another stage of progress, or disrupting the work of all to inform them that a privileged few are to be favored.
2. A clear, concise statement as to the reason for the demonstration — its relation to past, present, and future activities.
3. A lucid explanation of the names and uses of unfamiliar tools, materials, and operations, with the necessary minimum of related information.
4. Correct, accurate diction, and acceptable speech.
5. A sequence of skillful operations that parallels current trade practices.
6. Procedure at a rate that is compatible with pupil comprehension; at the same time allowing opportunity for pertinent questions and references to the visual aids.
7. Emphasis upon safety practices and reasons therefor.
8. Brief review of key terms and steps in the demonstration.
9. Dismissal of the group.

Once the group has returned to work, the instructor can then check as to the effectiveness of the demonstration by observation and questions of individual pupils.

The following score card may be used by the instructor in checking himself. It also may be used in aiding a supervisor to check demonstrations, or it may be used by practice teachers in checking the effectiveness of each other's methods of presenting demonstrations.

Evaluating a Demonstration

Student's Name .....

Topic: .....

Directions: Points for each of the following items are to be awarded, ranging from 5 for excellent to 1 for poor.

I. Need ....
II. Preparation
- *a*) Tools ....
- *b*) Materials ....
- *c*) Visual aids ....
- *d*) Area ....
- *e*) Preliminary practice ....

III. Actual Demonstration
- *a*) Assembling of pupils ....
- *b*) Correlation of objectives to
  - 1. Previous activities ....
  - 2. Future activities ....
- *c*) Sequence of operations ....
- *d*) Explanation of unfamiliar terms ....
- *e*) Delivery ....
- *f*) Related information ....
- *g*) Skill ....
- *h*) Rate ....
- *i*) Safety precautions ....
- *j*) Pupil questions ....
- *k*) Review of key terms and operations ....
- *l*) Dismissal ....
- *m*) Check on pupil performance and comprehension ....

Total ....

Suggestions for possible improvement: .....

.....

.....

Critic .....

The Industrial Arts Policies and Planning Committee Prepares for the Future

S. L. COOVER
Director, Industrial Arts Department
State Teachers College
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For a decade a small group of industrial-arts leaders has been meeting informally to consider ways and means of furthering industrial-arts education through the industrial-arts section of the AVA.

Arthur Mays of the University of Illinois presided over the first meetings of the group which included among others: Homer J. Smith of the University of Minnesota; E. E. Ericson, University of California, Santa Barbara College Branch; Stanley Pawelek, supervisor of industrial arts, Baltimore public schools; Wm. Bawden, formerly head of the industrial arts education department, Pittsburgh, Kans.; Maris M. Proffitt, formerly specialist in industrial-arts education in the U. S. Office of Education.

In 1948 the executive committee of the AVA gave official status to the organization by appointing a 12-man committee with E. E. Ericson as chairman. The committee selected from its members a small inner representative body which was called the *cabinet*. The duties of the cabinet were to set up and develop plans for furthering industrial arts, to act as a steering group for the larger committee, and to develop a theme for the industrial-arts section meetings of the AVA annual convention.

Early in 1949 Frank Moore who was then vice-president of the AVA called a cabinet meeting in the AVA offices in Washington. The following members attended: Verne L. Pickens from Kansas City, Mo.; DeWitt Hunt from Stillwater, Okla.; Stanley Pawelek of Baltimore; as ex-officio member, John Ludington of the U. S. Office of Education and Roy G. Fales of Albany, N. Y., chairman.

One of the important matters of business at this session was the planning of the themes for the industrial-arts section meetings for the Atlantic City convention. It was here on December 8, 1949, that the IAPPC held its first official meeting

as a part of the industrial-arts program. During a single three-hour session, plans were laid for a better organization of IAPPC and tentative plans were made for a meeting of the cabinet during the spring of 1950.

Two committees were appointed. The first of these was requested to prepare a statement on the structure of the industrial-arts program which might be used as a clean-cut statement of industrial-arts policies and procedures which the executive committee of the AVA would support and promote. The chairman of this committee is G. Wesley Ketcham of Hartford, Conn. Working with him are John M. Hurley of New York City; James Hammond of Fitchburg, Mass.; Chris H. Groneman of College Station, Tex.; Claude Nihart of Los Angeles, Calif.; Lynne C. Monroe of Santa Barbara, Calif.

A membership committee was appointed consisting of Dewey Barich, chairman, of Kent, Ohio; Philip Waldeck of Columbus, Ohio; Gordon Johnson of Indiana; Gerald Baysinger of Michigan; and S. L. Coover of California, Pa.

The most recent cabinet meeting was held at the invitation of the executive committee of the AVA in Washington on April 5–7, 1950. The members chosen for the cabinet were Shriver L. Coover, of California, Pa., Chairman; Chris H. Groneman of College Station, Tex. (unable to attend); Stanley Pawelek of Baltimore, Md.; Verne L. Pickens of Kansas City, Mo.; Roy G. Fales of Albany, N. Y.; Frank C. Moore, president of the AVA; John Ludington and L. H. Dennis of Washington, D. C.

This conference opened with the revision of a tentative set of rules for governing the procedures and selection of personnel of the IAPPC. This is to be submitted to IAPPC for consideration and adoption at the next convention which will be held in Miami, Fla., November 27–December 2, 1950.

The cabinet defined its work as long-time planning for the improvement of all phases of industrial arts. Among these plans were:

1. The preparation of suitable material for publication in the AVA *Journal*. It was agreed that there should be a series of articles which will cover such topics as: What can industrial arts contribute to general education?; What art the best current practices in industrial arts?; and What is the relationship of industrial arts to other areas of education within the school curriculum?

2. Another committee will prepare suitable materials for publication in other educational journals which are read by school executives and those in general education areas.

A Preview of the Industrial-Arts Section Meetings at Miami, Florida

The cabinet is preparing for the best sectional meetings that have ever been held for the 1950 AVA convention. On Tuesday, November 28, there will be the usual meeting of the state and city supervisors, but with a difference. There will be fewer speakers from the rostrum and more general discussion from the floor. Come around with what you think are burning problems and ask the chairman to include them in the discussion.

The IAPPC will hold both a morning and an afternoon meeting on Tuesday to give sufficient time to consider the plans which have been made by the Cabinet and to discuss future plans.

Wednesday, November 29, will be devoted to a meeting which will deal with community resources and conditions as they affect the industrial-arts program in the public schools.

Thursday, November 30, will be devoted to a meeting which will be organized by the chairman of IAPPC for the purpose of presenting to the industrial-arts section the tentative plans and proposals for development of the industrial-arts section. Reports of achievement to date will be made and stress will be laid upon the leadership opportunities and possibilities for the members of the industrial-arts section.

Friday, November 31, will be devoted to a study of the curriculum, with an address by Dr. John Ludington, specialist of the U. S. Office of Education, followed by a pictorial representation of ways and means of organizing and planning industrial-arts shops. The colored pictures which will be shown will interest all industrial-arts teachers.

DRIVER TRAINING

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In any learning process the existence of individual differences between learners soon becomes evident to the instructor. Certain learners in driver training have more difficulty than others in the co-ordination or timing of the necessary motor movements for smooth and efficient vehicle operation and control.

The simple maneuver of operating the clutch and accelerator during the shifting period is often not co-ordinated properly. This not only makes shifting more difficult but also prevents smooth vehicular movement or acceleration. To prevent the engine from acting as a braking force to the vehicle, the clutch must be disengaged first and the accelerator released soon thereafter. If there is delay in the release of the accelerator the engine "races." This is not conducive to efficient and smooth shifting. If the foot releases the pressure on the accelerator before the clutch is disengaged the engine slows down. This applies a braking effort to the motion of the vehicle thus preventing smooth operation.

In trying to prevent these undesired results, the learner is first told how to perform the operation properly, and then a demonstration is given to show him how it is to be done. The learner then drives and tries to follow the instructions which he received.

In the meantime he is again being told and advised as to what to do.

During the process of training, the words "down on the clutch and up on the gas (accelerator)" are repeated time and time again. This produces acceptable results with the majority of learners. However, some were too slow in developing this co-ordination. It was realized that something besides talking and demonstrating was needed to assist the more obstinate cases, and to speed up the learning process so as to get all students up to the point of passing the state driver's examination in the shortest possible time. The training time behind-the-wheel is allotted so that each learner gets eight hours. To assist the slow student, a hook of heavy wire, similar to a fishhook, was made. This was tied to a cord 36 to 48 in. in length. The hook was slipped around the rod which goes from the accelerator through the toe boards. Then the process and instruction "down on the clutch and up on the gas" was repeated. Then the instructor watches when the student depresses the clutch pedal and by means of the cord gives a little assistance to the "up on the gas" movement. It is surprising how much this helps the learners in co-ordinating the proper move-

ments and how quickly they learn. It is a real time saver.

This year our program has been non-credit and extracurricular.

The program comprises twenty hours in the classroom which, the writer believes, should be the minimum, as much of the necessary background, knowledge, and correct driver attitude is developed in the classroom. This minimum time may be increased to probably 25 classroom hours if physical tests are administered. The in-the-car instruction consists of 32 hours, 8 of which are at the wheel. Experience leads the writer to believe that this time should likewise be the minimum for in-the-car training. He has found that in this time and with concentrated effort and hard work, the learner can be taught to be a pretty good driver with a proper foundation and attitude for future self-development. When examined by the state driver examiner in June, there was but one failure; she did not see or she did not obey a *temporary* school stop sign.

Experience also leads the driver to believe that it is wrong to offer courses devoting less time to the program than that recommended in the foregoing. There are some schools that offer two hours, and others four hours of at-the-wheel training. This seems to be too short a time to develop acceptable standards in the beginner.

Some of these driver courses call for a co-operative plan, two or four hours at-the-wheel at school and *the rest* with dad, mom, brother, or what have you. Often dad, or "what have you," does not function for lack of time, interest, or for other reasons. Should dad function and use the family car with no dual controls and the parking brake located out of his reach on the left side, a serious potential accident hazard is created. Ultimately training must be given under actual traffic conditions. Then, too, the relationship is not conducive to a good teaching or learning situation. Also, dad may unwittingly teach some bad driving practices. The average dad's driving corroborates that belief.

This has been evident when a learner who has driven a little, takes driver training. It then becomes necessary to break some bad habits and practices that he has previously acquired, and causes a retardation of the learning process.

If there is to be a driver training program we cannot afford to have a poor program. Would your community contribute to save the life of anyone in need? Yes. Your driver training program will save life, limb, and property. It will pay big dividends to you and to society.

The school should accept the responsibility of teaching inexperienced youth "to operate the accelerator with his head instead of his foot," and thus to save a life — probably the driver's own life.

Problems and Projects

CARVED LEATHER KNIFE SHEATH

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Most boys, especially boy scouts, will find the knife sheath interesting to make and especially useful. The knife sheath shown in Figure 1 presents an opportunity to do some heavy tooling and introduces several new processes such as venetian lacing and riveting. Also, it makes a very attractive project and would be a gift highly treasured by a sportsman.

The novice will find the experience gained from tooling a design of this size, extremely valuable before attempting large surfaces as would be involved in a ladies' underarm bag, notebook, brief case, etc.

Fig. 1. Carved leather knife sheath

Procedure

A. *Design*

Select a rather intricate design composed of short curves and fine detail for this project in leather carving. A complete full size template as shown in Figure 2 will be required for the project.

B. *Preparing Leather for Tooling*

1. Select and cut a piece of 8-oz. vegetable tanned, natural grain, unglazed "Russet" leather, 2¾ by 7½ in., for the front piece.
2. Submerge the piece of leather in water for about thirty seconds.
3. Remove the leather from the water and wipe off the surplus water.
4. Wrap the piece of leather with heavy paper and allow it to stand for 24 hours, or until the proper moisture content has been reached.

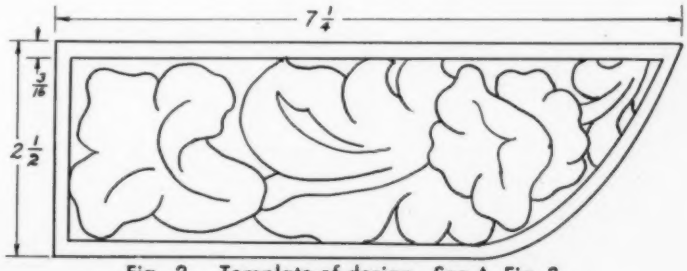


Fig. 2. Template of design. See A, Fig. 3

C. *Transferring the Design*

1. Clip the pattern to the smooth or grain surface of the leather with paper clips.
2. Place the leather on a smooth hard surface, such as plate glass or marble, and trace the design lines firmly with a modeling tracer or a blunt pointed ice pick.
3. Remove the pattern and mark the lines deeper into the leather with a modeling tool.

D. *Tooling the Design*

1. Place the project on a very smooth and

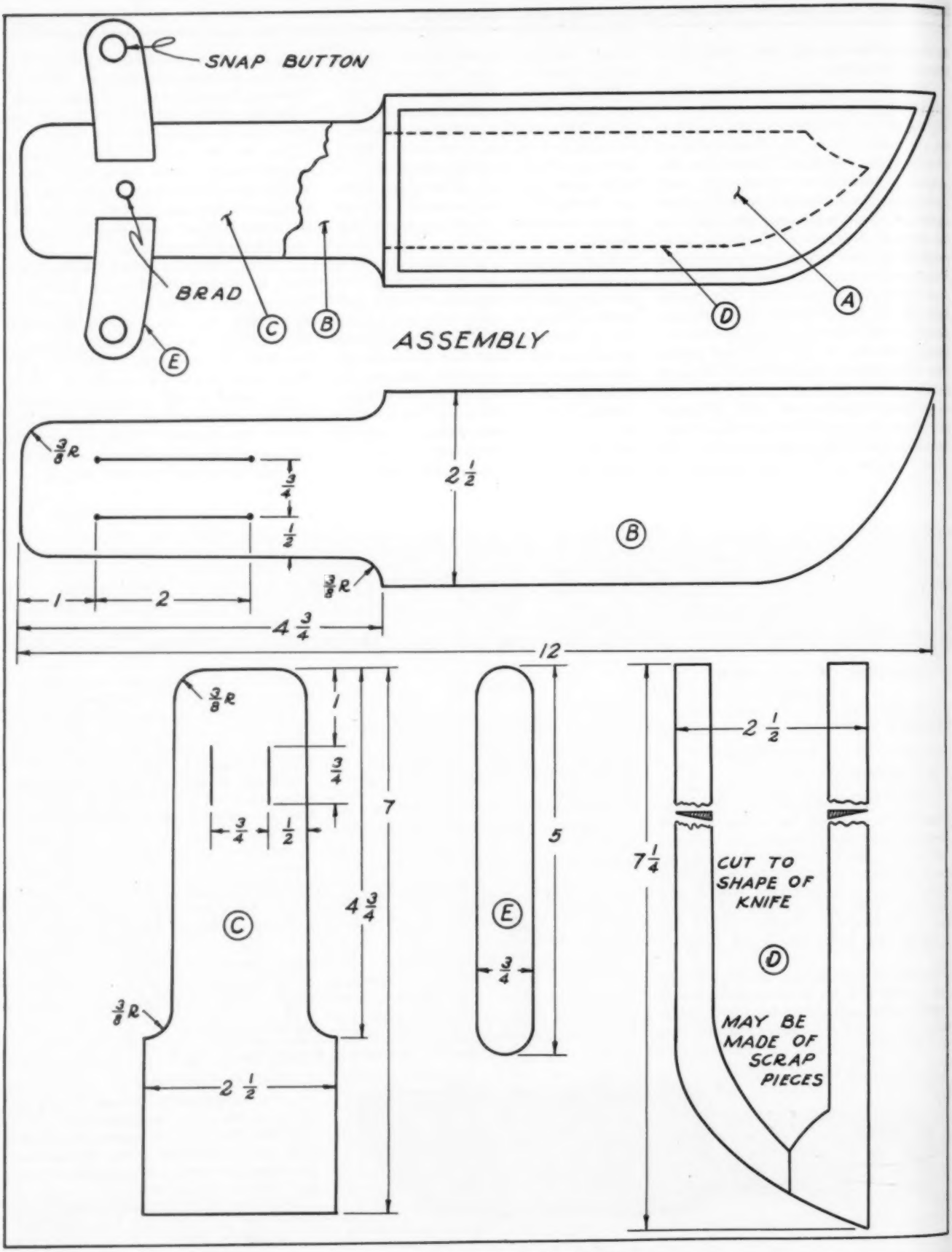


Fig. 3. Details of the knife sheath

hard surface such as a marble slab with the flesh side down.

2. Set a pair of dividers equal to the width of the border and proceed to cut the border lines with the sharpened point of the dividers using the second leg as a gauge.

3. Place a 3/16-in. cutter in the swivel knife and proceed to carve the design. The direction of the cut should be toward the worker, and the depth of the cut should be approximately halfway through the leather.

4. Use a beveling tool and an 8-oz. soft face hammer and bevel all curved lines on the outside of the curve.

5. Select an oval depression tool and form sufficient impressions in the leather to give relief to the plain surfaces. If deep rich coloring is not obtained in this operation, the leather may be too dry. If this is true, then more moisture should be added to the face surface of the leather with a dampened sponge.

6. Additional ornamentation may be applied with horseshoe or scallop shaped tools as may be observed in the photograph.

7. The background area should now be depressed with a six dot line tool or a round pebble dot tool. Care should be exercised not to allow the tool to overlap or re-strike the background.

8. The entire floral design should be touched up with a modeling tool by rounding and molding the lines.

9. Skive the edges of the reverse side of the leather. Do not skive the top edge.

10. Cut strips for protective edge, and skive the strips on the reverse side, as shown at *D*, Figure 3. These strips are necessary to protect the lacing from being cut by the knife.

NOTE: Cut the inside of the protective edges so the knife has about 1/16 in. clearance all around.

11. Cement the protective edge, Part *D*, to the reverse side of *A*.

12. Select and cut a piece of 8-oz. "Russet" leather for the back as shown in detail *B*. Figure 3. Punch No. 6 holes at each end of the 2-in. belt slits before cutting the slits.

13. Select and cut a piece of 3-oz. tooling calf leather for the back facing as shown in detail *D*, Figure 3.

14. Lay out the 3/4-in. long slits to receive retainer strap, *E*. Punch No. 4 holes at each end of slits and cut the slits.

15. Select and cut a piece of 3-oz. tooling calf leather for the retainer strap as shown at *E*, Figure 3.

16. Attach retainer strap *E* to *C* with a small rivet.

17. Skive the edge of part *B* on the flesh side.

18. Using a spring punch with a No. 4 punch, space 1/4-in. holes across the top of the front piece, the *A* part. Make sure the first and last holes are properly located so that they will line up with holes to be punched for the side lacing.

19. Select and cut 12 ft. of 3/8-in. venetian lacing.

20. Cut off a strip of lacing about 8 in. long and lace the top edge of part *A*, Figure 3. Allow 1 in. of lacing to extend through the first and last holes to finish off with in lacing the edges.

21. Cement part *A*, the tooled front piece, to *B*, placing flesh side of leather to flesh side.

NOTE: Do not apply rubber cement to the area between the belt slits of part *B*.

22. Using a spring punch with a No. 4 punch, punch 1/4-in. spaced holes around the sheath.

NOTE: Always punch 6 or 8 holes at a time, and then lace them, rather than punching all of them at once. Holes around curves should be slightly closer together.

23. Start lacing near the retainer strap and proceed around the sheath. Pull lacing tight.

24. Punch holes for snap button assembly and assemble snap on the retainer strap.

25. Clean sheath with oxalic acid.

26. Finish sheath with leather lacquer.

MELTING FURNACE FOR THE FOUNDRY AREA

CHARLES W. CARLOCK
High School
Hobart, Ind.

A very efficient melting furnace capable of melting aluminum, copper, brass, and other metals with melting points near or below 2000 deg. F., can be constructed very cheaply and easily out of odds and ends found in almost any school.

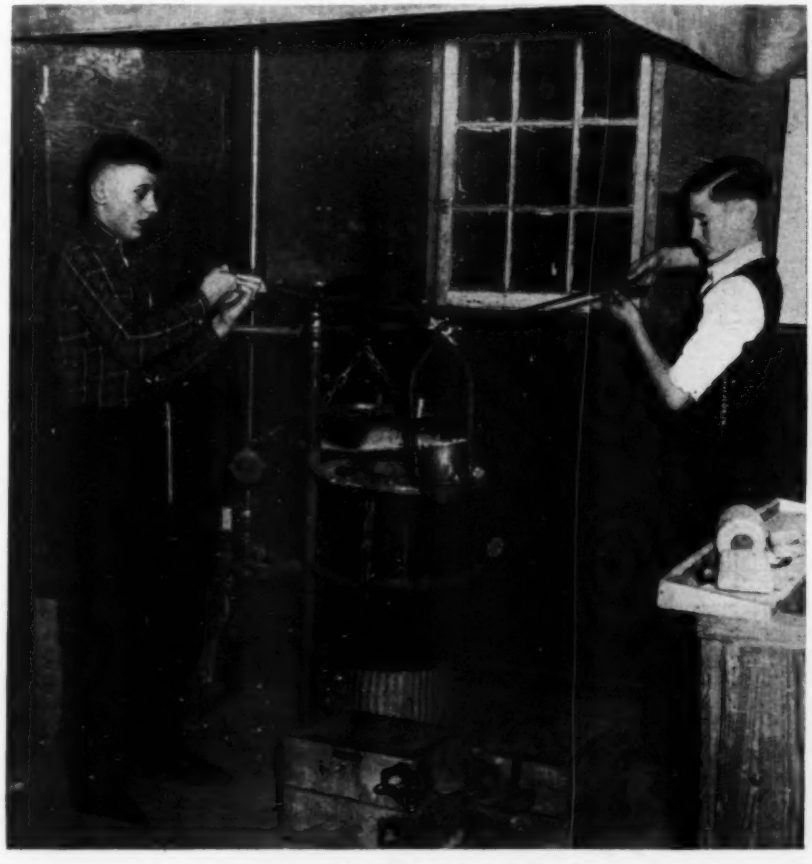
The following general procedure, with the accompanying photographs and drawings, will aid in the construction of the furnace.

A 55-gallon drum forms the outer casing of the furnace. With an acetylene torch, cut the drum into two parts approximately 6 in. from the upper rim. The smaller part then is to be used as the lid and the lower as the casing of the furnace proper.

The lining should be made out of a good grade of firebrick that will withstand temperature up to 2000 deg. F., without deteriorating too rapidly or it will need replacing too often.

Three bolts placed through the upper surface and extended down into the fire clay between the bricks help hold the lid lining in place. These bolts also are used to fasten the hoist chains to the lid as shown in Figure 17, page 281. Also, crimp the edge of the lid in about 1/4 to 3/8 in., which will help hold the lining in place when the lid is raised in opening the furnace. Cut a 3 1/2-in. hole in the middle of the top to allow the burnt gases to escape. A No. 2 tin can can be used as a form to hold the fire clay in place until it dries, and after a few firings, this can will burn out, leaving a neat round gas escape orifice.

Before lining the furnace proper, cut a 2-in. hole in the side approximately 8 in.



Melting furnace in operation

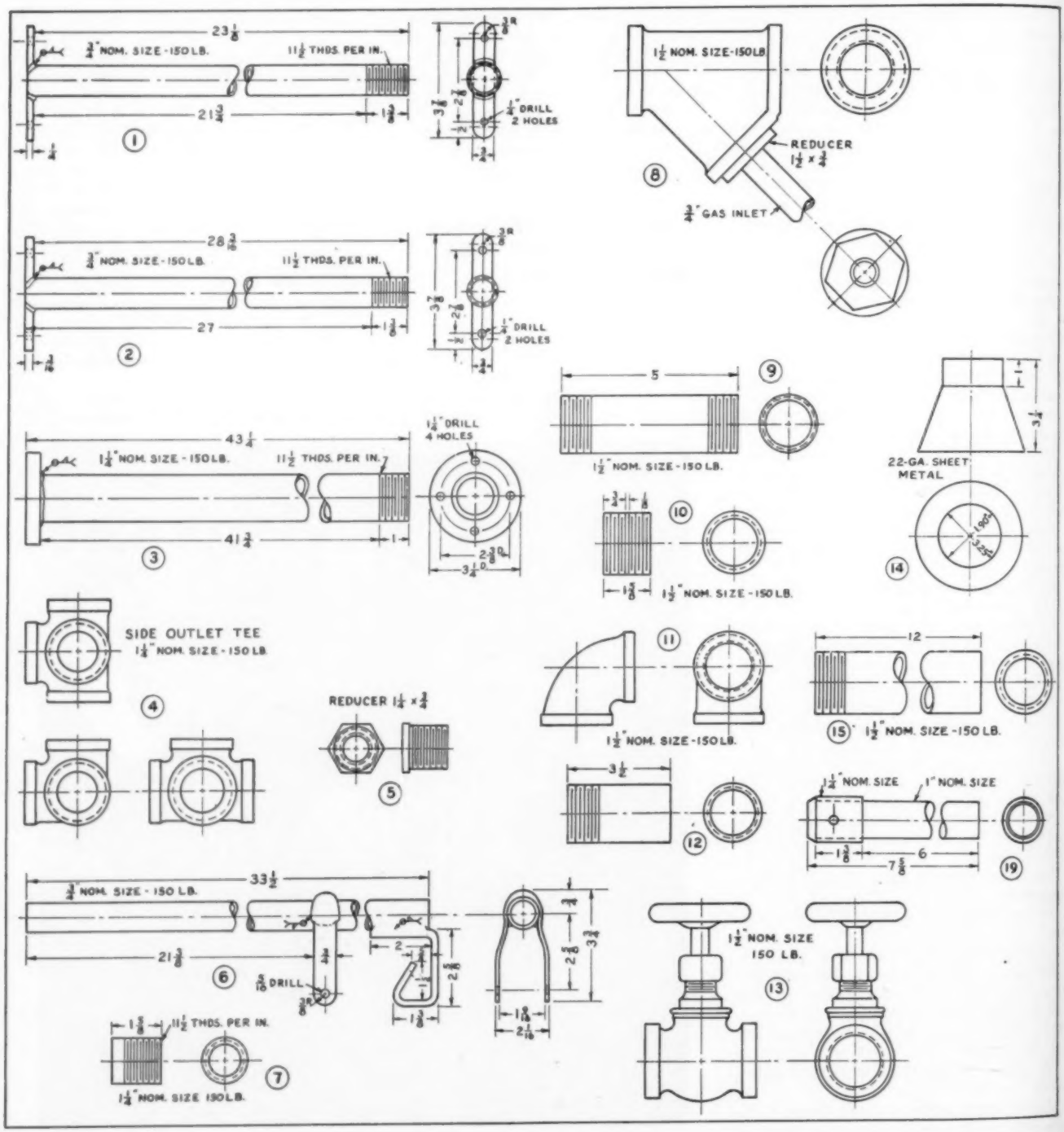
from the bottom and insert a 12-in. piece of 1½-in. steel gas pipe in at an angle as described in Figure 18. By placing the pipe in at an angle, a better fire can be obtained as the flame swirls and spirals around; heating the melting pot or crucible more evenly, thus eliminating the additional gas air jets which otherwise would be needed to give a good even heat.

The bricks should be placed to form a wall lining of approximately 4½ to 5 in. thick and the bottom 5 to 6 in. thick. Then the gas air jet will be lying directly on or near the bottom so that the entire pot or crucible will be in contact with the flame. The lining should be allowed to set a few days to allow proper drying.

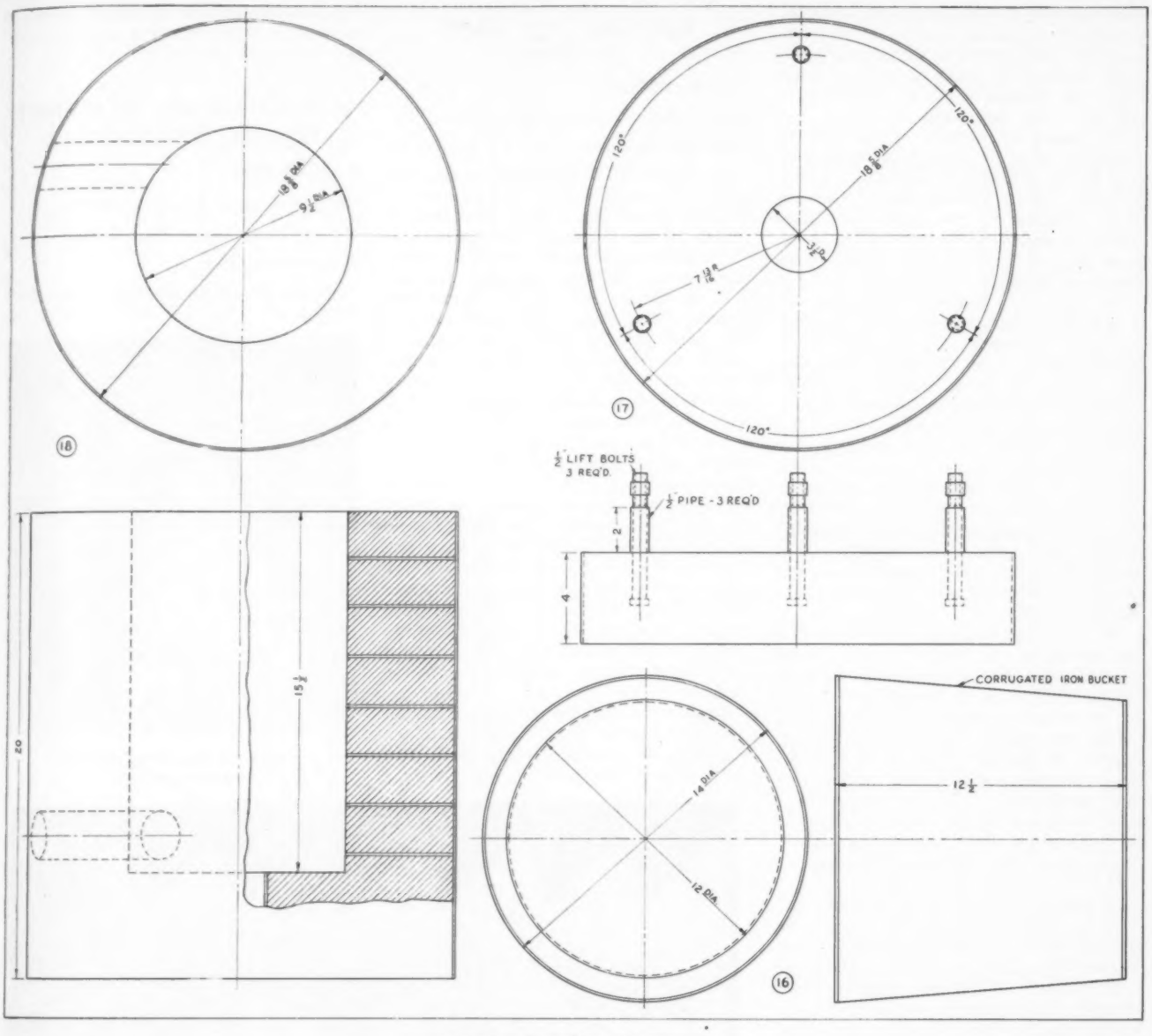
The base was made out of an old steel mop bucket turned upside down and nailed to the floor. The furnace then is set upon the spot welded to it.

Fastening the base to the floor should not be accomplished until the hoist is completed and a check made to see if the lid can be swung fully open without being obstructed by the horizontal braces.

The hoist is made out of regular steel


¾" NOM. SIZE - 150 LB.
11½ THDS. PER IN.
¼" DRILL 2 HOLES
1½" NOM. SIZE - 150 LB.
REDUCER 1½ x ¾
¾" GAS INLET
1¼" NOM. SIZE - 150 LB.
1¼" DRILL 4 HOLES
22-GA. SHEET METAL
SIDE OUTLET TEE
1¼" NOM. SIZE - 150 LB.
REDUCER 1½ x ¾
1" NOM. SIZE
5/16 DRILL
1¼" NOM. SIZE 150 LB.

Details of melting furnace



Details of melting furnace

gas pipe and fittings. A 1¼-in. pipe 43 in. long with a flange welded on the bottom forms the upright piece of the hoist and also acts as a brace for the furnace. The flange is drilled to facilitate in fastening the piece to the floor with wood screws as shown in Figure 3. Four No. 10 by 1½-in r. h. screws are used for this. A 90-deg. side outlet tee is then screwed onto the upper end of the pipe and two 1¼ to ¾-in. pipe bushings are used to fasten the two ¾-in. pieces of pipe, which form braces, to the vertical piece. These two braces should be at least 20-in. long to give a working area behind the furnace and also allow enough space in which to mount the blower. A 1⅝-in. piece of 1¼-in. pipe is then threaded into the upper part of the tee. The top edge of this piece, which will act as a bearing surface, should be turned down in a lathe. This will allow the moving part of the hoist to turn easier. The pivot which sets on top of the upright, and acts as a fulcrum for the arm or boom, is made of 1-in. pipe 8 in. long with a 1-in. length of 1¼-in. pipe placed over it at the top and then welded to it. A 5/16-in. hole is drilled through this piece ½ in. from the upper end as illustrated in Figure 19. The boom or arm is made of ¾-in. pipe and a U-shaped piece, or yoke, Figure 6, is welded to it. One-quarter inch holes are drilled in the yoke ½ in. from each end. The location of the yoke on the boom depends on the exact size of the oil drum used. It should be placed so that the end of the arms extends approximately 1 in. beyond the center of the lid. A ¼ by ¼-in. bar is then shaped as a hook, Figure 6, and welded to the lower side of the arm. This is to be used as a support for the three chains, which are fastened to the lid, onto the boom. The length of the chain used will vary slightly according to what type of base and length of oil drum used. Any chain of medium strength will be suitable. We used a piece from a discarded playground swing. Place the boom in position so that the holes in the yoke align with the hole in the pivot piece and insert a 5/16-in. bolt to hold it in position. Insert the pivot tail (1-in. pipe) into the upright, Figure 19, and while holding the boom in a horizontal position, determine the length of the chain. A counter balance can be added to the opposite end to facilitate in raising the lid.

A bolt placed on the horizontal brace acts as a rest to hold the lid when it is in the

open position. The location of this must be determined by measuring the distance from the center of the pivot to the ganging length which connects the chains to the boom hook. Again the location will vary according to the size of the drum used.

The braces are fastened to the walls by two pieces of ¼ by ¾-in. band iron 3⅞ in. long. Before welding one to each brace, drill a 3/16-in. hole ½ in. from the end of each piece. Number 10 r.h. screws or larger should be used with the length being determined by the type of wall to which the braces are fastened.

The blower is a discarded vacum sweeper. A sheet-metal adapter connects the discharge opening of the sweeper to a discarded 1¼-in. 90-deg. radiator valve. The blast of air is then directed into a Y fitting, where it mixes with the gas entering through the other opening. In using 1½-in. pipe as a mixing chamber, a hot flame can be easily obtained by adjusting the two control valves. At first, a smaller pipe was used for a mixing chamber, but the proper flame was never obtained. Then the larger pipe was tried and excellent results were obtained. A ¾-in. pipe is used to carry the incoming gas into the Y connection and a regular gate valve is placed on this pipe a few feet from the Y.

The following method is recommended in the lighting of the furnace. Crush a small piece of paper into a small wad, and after lighting it, lay it in the furnace near the gas air jet. After the blower is turned on, open the air valve slightly, but not enough to extinguish the flaming paper. Then open the gas valve slowly and watching the fire, continue opening both air and gas valves slowly, until the desired flame is obtained. After the fire brick is hot (red) the air blast can be turned higher or the gas lower to get the best fire.

In lighting a warm or hot furnace, care must be taken to avoid any gas entering the chamber until a flaming paper is placed in the furnace. This lighted paper may be eliminated if the lining is still red hot as the heat from this will ignite the gas. If ever in doubt as to whether the heat inside the warm furnace will light the gas, play safe and use the flaming paper method.

We have found that a furnace of this type will melt 6 lb. of aluminum in 15 to 20 minutes and 8 lb. of copper in 45 to 50 minutes with both tests starting with a cold furnace.

In our general shop, where we have 6 classes a day, we melt enough aluminum for each class in 10 to 12 minutes, after the furnace is once heated.

Speeding on U. S. streets and highways in 1949 killed 10,000 men, women, and children. — *The Travelers*, Hartford, Conn.

Speeding on U. S. Streets and highways in 1949 injured 398,700 men, women, and children. — *The Travelers*, Hartford, Conn.

TEACHING AIDS MADE OF METAL

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Brookings, S. Dak.

For some time I have been making saw patterns for teaching aids. These patterns differ from the old conventional wood type inasmuch as they are made from alum.num.

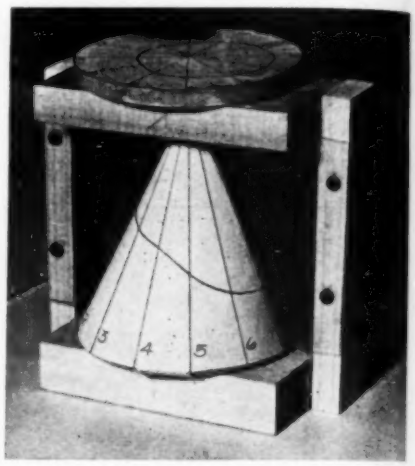
The patterns are made from ⅛-in. aluminum which in my case was scrap. The patterns are laid out and cut on a jig saw with a metal cutting blade. A fine blade run at a high speed aids in finishing as it gives a smooth cut. The bevels on the teeth are filed with a coarse file and smoothed up with a fine file. In filing aluminum the file is held in contact with the metal on both the forward and backward stroke. The back stroke in this manner aids in keeping the file clean. I find that a scale of 1 ft. to 1 in. is suitable for size and eliminates the problem of storage and yet is large enough for the students to see from the instructor's desk. In my latest patterns I have a dotted line on one tooth of each pattern showing the point where the set starts. The lettering is done with a stamping set and the lines were made with a scratch awl. Black enamel paint is rubbed into the lettering and the patterns are then sanded with a sanding machine.

These metal patterns are more desirable than wood patterns due to the fact that they will not break easily if a student drops them and the set can be shown more accurately. I feel that less time is required to make the patterns of metal and with reasonable care they will last a long while.

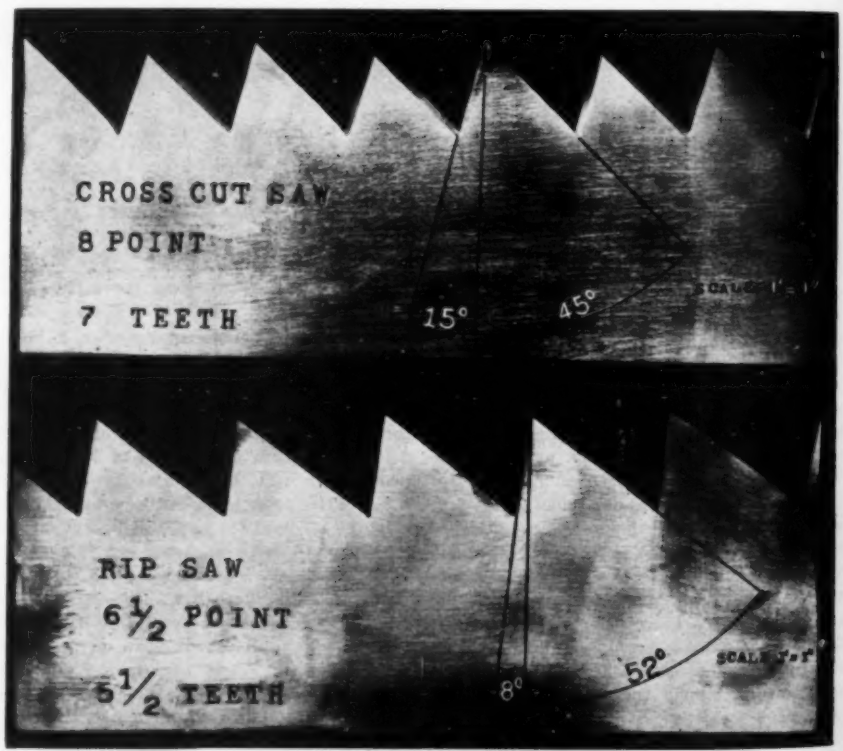
A TEACHING AID TO SIMPLIFY CONICAL DEVELOPMENTS

B. A. KNIGHT
Head, Industrial Arts Department
George Washington High School
Indianapolis, Ind.

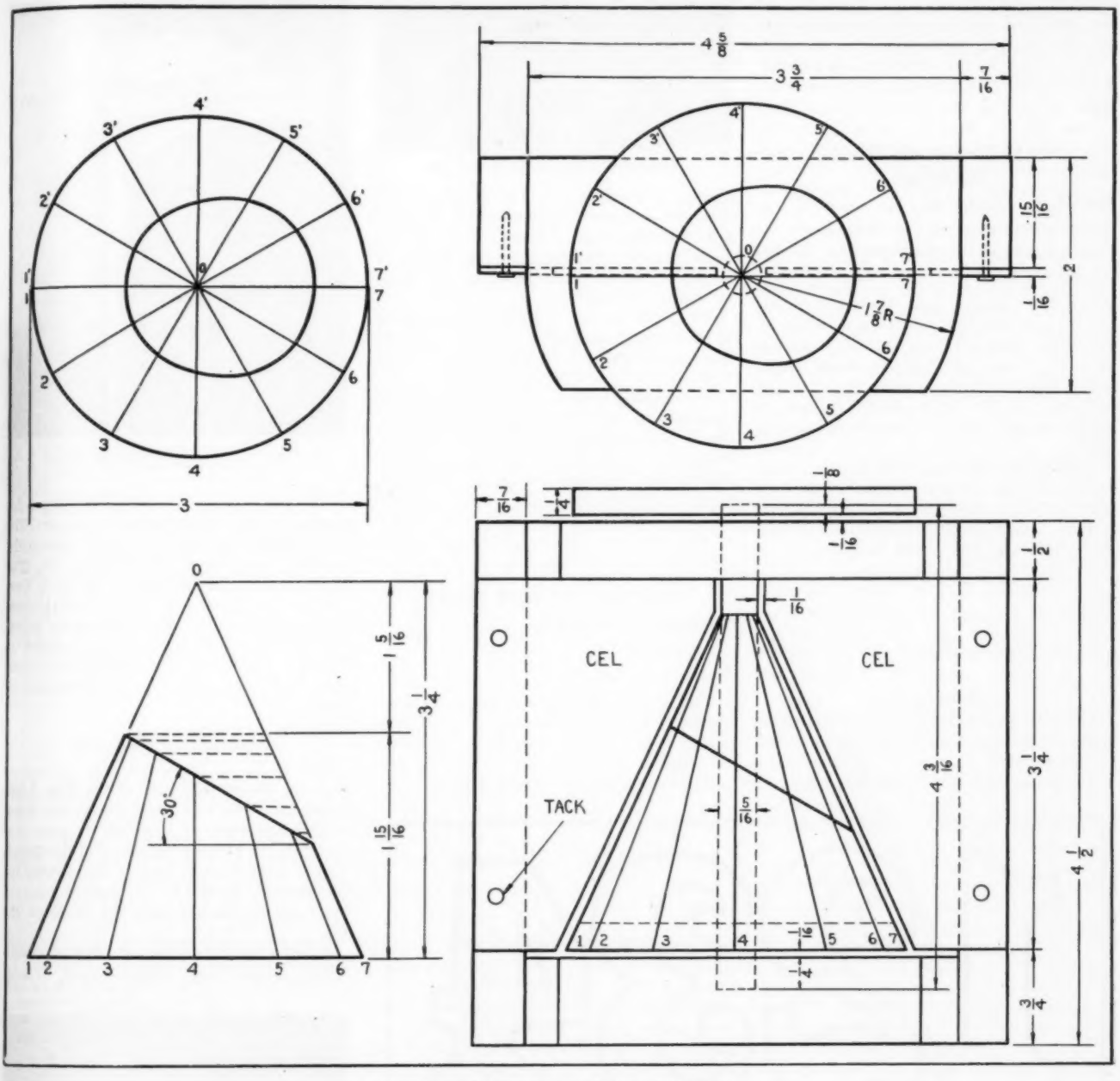
To help him in his teaching of mechanical drawing the writer has made a number of



Aid for teaching conical developments



Metal teaching aids



A teaching device in mechanical drawing

teaching aids to supplement the slides and models which he uses.

In teaching the development of a truncated cone, cut at an angle, students do not always know or see how to get the true lengths of the elements in order to transfer this information to the stretch-out pattern. To assist these students, the device illustrated and described herein was made. It consists of a cone revolving on a vertical axis. This axis consists of a 5/16-in. dowel, which extends into the base of the framework, and upward through the top crosspiece of the frame and into the circular disk made of 1/4-in. plywood. This disk has a diameter equal to that of the base of the cone. It thus becomes the top view of the cone, and is divided into a number of equal parts (twelve spaces in this case) to indicate the elements drawn on the surface of the cone. These elements on the cone and on the circular disk are inked in red. Next, the cone is cut at an angle and this line is indicated with black ink. The top view of this truncate is also indicated in black on the disk that controls the rotation of the cone. All elements are numbered both on the cone and on the disk so that they agree when trying to find the true length of any element or portion of an element.

In completing this device, two triangular pieces of celluloid (from old triangles) are fastened to the uprights as shown. The inside edges of each parallel closely the sides of the cone. The two pieces are so placed that the front surface of each is in line with the center of the pivot or dowel, thus becoming a vertical plane.

One half of the surface of the cone can be seen at all times in the front view, and it is clearly evident that the two sides of the cone are true in length because they are parallel to the vertical plane.

If any element is rotated to coincide with the V plane, the true length of the element or portion of the element can be obtained

at once. This then may be transferred to the numbered elements on the stretch-out, and thus a true pattern may be obtained.

This device, like any teaching aid, strongly reinforces the oral instruction or the printed page.

PLASTIC BRIDGE TABLE MARKERS

FRANK A. THOENDEL
Assistant Professor of Industrial Arts
Nebraska State Teachers College
Chadron, Neb.

This is a simple plastic project that will win the approval of the feminine members of the family. This project is especially popular when the women's bridge club meets. These plastic table markers become an attractive ornament for the bridge tables as well as numbering the tables for playing progressive bridge.

Working procedures involved in this project include sawing, filing, sanding, buffing, and cementing. The simplicity of the working operations makes this a fine project for either junior or senior high school students.

BILL OF MATERIALS

No. of pieces	*Material*	*Size*
1	Plexiglas (clear)	¼ x 2¼ x 5 in.
4	Plexiglas (amber)	¼ x 1⅜ x 2 in.

Procedure

The numbers are transferred to the masking paper of the clear piece of Plexiglas by means of carbon paper.

The numbers are sawed out with a jig saw, coping, or jeweler's saw. The edges are then filed with jeweler's files and sanded with 120 grit followed with 360 grit wet and dry abrasive paper. The edges are then buffed on a muslin buffing wheel using plastic rouge to obtain a fine polish.

Plastic bridge table markers

The bases are cut from the amber plastic to the required dimensions — 1⅜ by 2 in. The edges are finished in the same manner as the numbers.

The masking paper is then removed from the surfaces of both the numbers and the bases. The numbers are centered and cemented to the bases using Luplex Cement. Follow the directions printed on the bottle.

As a finishing step, glass wax is applied over the entire surface of the project to add to the luster and also to protect the plastic surfaces from scratches.

TILE-TOP FLOWER TABLE

THOMAS H. ROBERTS
High School
Valparaiso, Ind.

The flower table shown in Figure 1 cannot be classified as a reproduction of any certain design. It is rather an attempt by the author to design a table with simple, pleasing lines that would embody a top set with tiles.

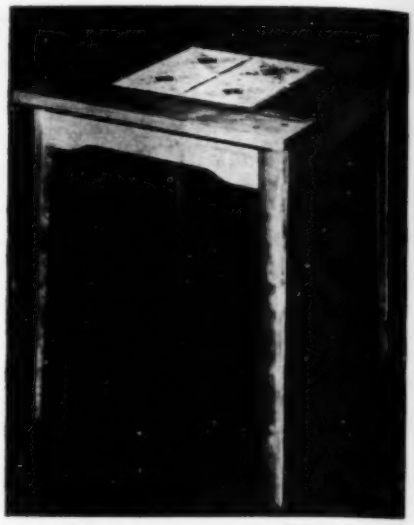


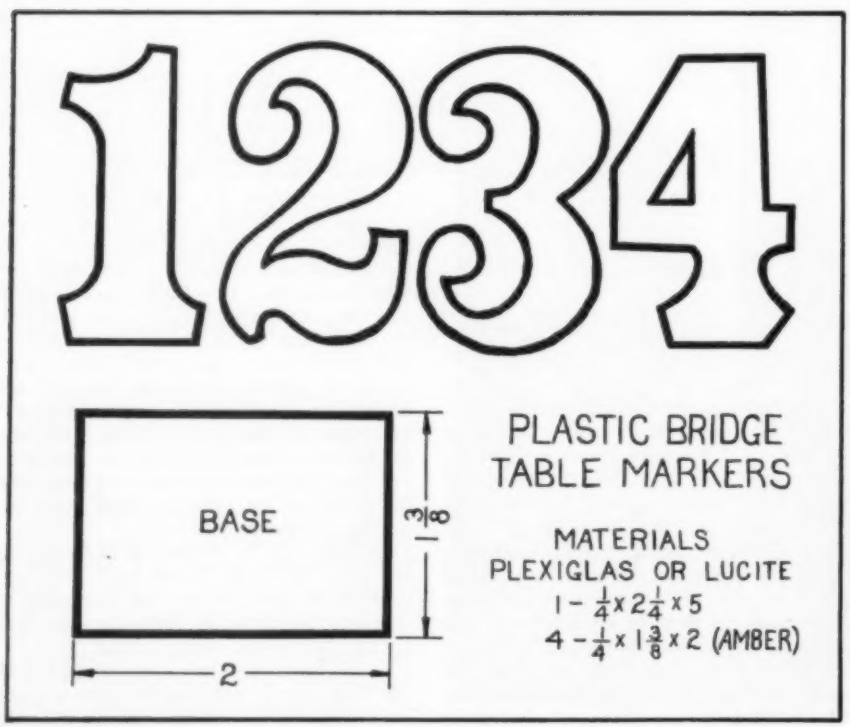
Fig. 1. Tile-top flower table

The tile top provides a center piece for flowerpots that is impervious to water. The tiles pictured in Figure 2 were handmade, obtained from Plymouth Meeting, Pa. The design reflects the influence of the early German potters. Commercial tiles of suitable size may be obtained at most department stores and substituted in place of those shown in Figure 2. Other designs could be created and made in the ceramics area of the industrial-arts laboratory.

Selection of Materials

The choice of wood should be in keeping with the design and color of the tiles. Light colored wood such as birch, cherry, and maple or bleached woods of other species harmonize best with the pleasing simplicity of the design. Yellow birch (Betula Lutea) was chosen for the table in Figure 1. The natural color of the wood blends well with the colors of the tile.

Hardware can be obtained from any well-known supply house. Various kinds of tiles



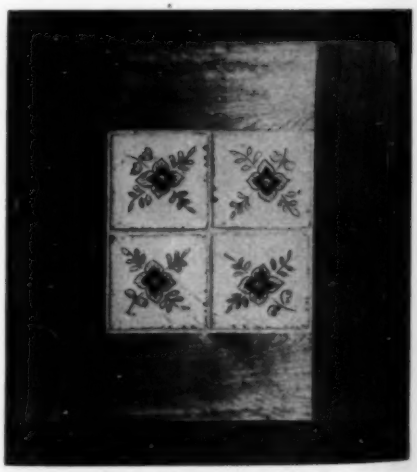


Fig. 2. Custom designed tiles

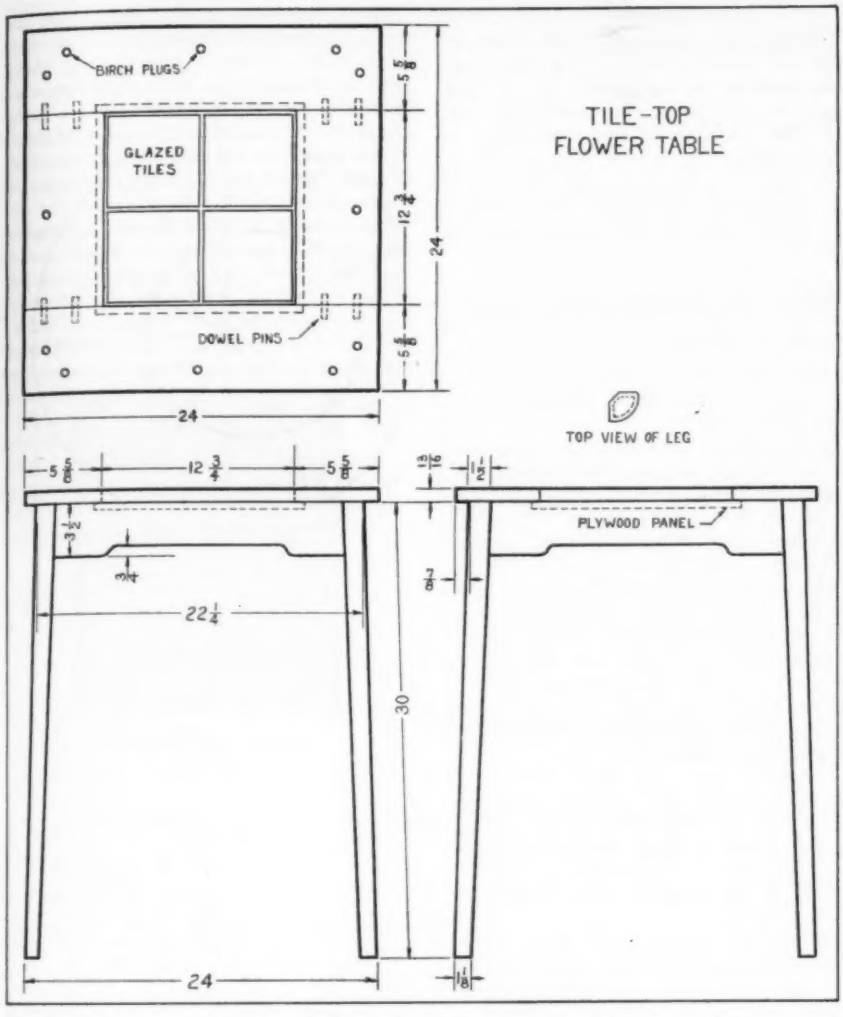


Fig. 3. Details of tile-top flower table

may be bought from department stores or tile manufacturers. Original or custom-made tiles may be secured from potters who specialize in handmade ceramic products.

BILL OF MATERIAL

No. of pcs.	*Name of part*	*Size*
4	Legs	1½ x 1½ x 29¼ in.
4	Rails	13/16 x 3½ x 19¼ in.
2	Top side rails	13/16 x 5⅝ x 24 in.
2	Top side rails	13/16 x 5⅝ x 12¾ in.
1	Fir plywood panel	¼ x 14 x 14 in.
3	Tile dividers	¼ x 5/16 x 12¾ in.
6	Tile dividers	¼ x 5/16 x 6 in.
12	Birch dowel pins	⅜ x 1¾ in.
4	Hanger bolts	5/16 x 3 in.
4	Table leg corner braces	2 x 4½ in.
8	R.H. blued wood screws	No. 8 x ¾ in.
14	F.H. wood screws	No. 6 x ½ in.
12	F.H. wood screws	No. 8 x 1¼-in.
1	1-lb. can wood crack filler	

Finished dimensions are given for all wood items in the bill of material. The craftsman should add ⅛ in. to all widths and ½ in. to all lengths in rough cutting the material.

Construction Procedure

The four legs may be cut from solid 2-in. stock, jointed and surfaced to 1½ by 1½ in. Should 2-in. stock not be available the legs may be made from 1-in. stock surfaced to 13/16 in. The surfaced stock should be cut to length then ripped to 1⅝ in. Determine the direction of the grain and glue up to form each leg. The pieces are then squared up to 1½ by 1½ in. The outside corner is selected and rounded to the proper shape as shown in the detail on Figure 3. Tapering is done only on the two inside edges of the legs, and should start 3½ in. from the top. The inside corners of the legs are chamfered in order to further reduce the size of the legs to carry out the concept of the design. Cut the legs to length at the proper angle. This angle cut should be made on both ends of the legs. Figure 3 shows that the outer surface of the bottom of the leg is in the same vertical plane as the outer edge of the table top. In order to establish the correct angle of the legs it is necessary to make a full size layout of a section of the top and leg. The T-bevel square is used to take the angle from the full size layout, and then used to transfer the angle to the proper power machine for cutting off the legs.

The rails are selected and rough cut. Rough stock should be surfaced to 13/16 in. then jointed to 3½ in. All rails are then cut to length with the proper angle at each end. Saw kerfs are made in the rails to receive the corner braces. The design is laid out and cut on one rail which becomes the pattern for the remaining three. All edges are smoothed up with a file or the power sander.

Side rails for the top frame are rough cut then surfaced to 13/16 in. and jointed to 5⅝ in. but left ½ in. longer than the net dimension. The end rails for the frame are worked out in like manner but are cut square to the proper length. Holes are then laid off and bored for the ⅜-in. birch dowels that hold the frame together as shown in Figure 3. The frame is then glued up and clamped. Since the side rails of the top were not cut to length, there will be short lugs at each end to cut off after the top is removed from the clamps. Sanding should be done with the grain and the outside corners of the top rounded slightly with sandpaper. Fasten the plywood panel to the top with No. 6 by ½-in. f.h. wood screws.

The leg corner braces should be fastened to the side rails with No. 8 by ¾-in. r.h.b. screws. The legs are placed in this assembly and marked for the hanger bolts.

Setting the Tiles

Craftsmen have at times encountered considerable difficulty in setting the tiles in wood table tops. Materials and methods used in anchoring the tiles to the base caused most of the trouble. Water mixed cement should be avoided. It is not advisable to use ordinary mortar. Should moisture be absorbed by the frame members the entire frame will bulge. When the moisture dries out the tiles will become loose. Mastic has been suggested by some authors, but this has not usually been altogether satisfactory.

The following method of setting tiles has thus far proved to be entirely successful.

1. The recess in the table top frame is made 1/16 in. deeper than the thickness of the tiles to allow for warped tiles.
2. Wood dividers are cut to the width of the joint between tiles and half the thickness of the tiles.
3. Warped tiles are leveled up by cementing wedges in the correct positions.
4. The tiles are then cemented in place directly upon the base with a good transparent cement.
5. The wood dividers are placed in the joints and forced down to the base panel.
6. The remaining portion of the open joint is filled with putty made with crack filler.
7. All joints are rounded out with a smoothing tool and the excess filler wiped off immediately.
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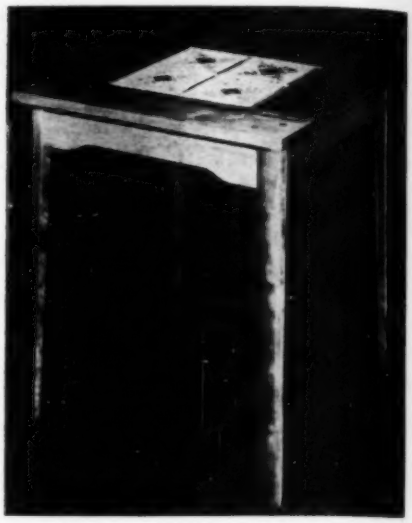

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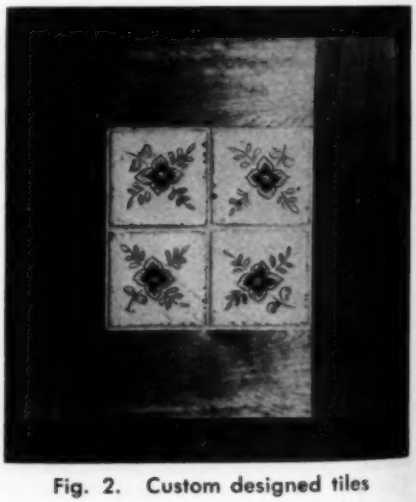

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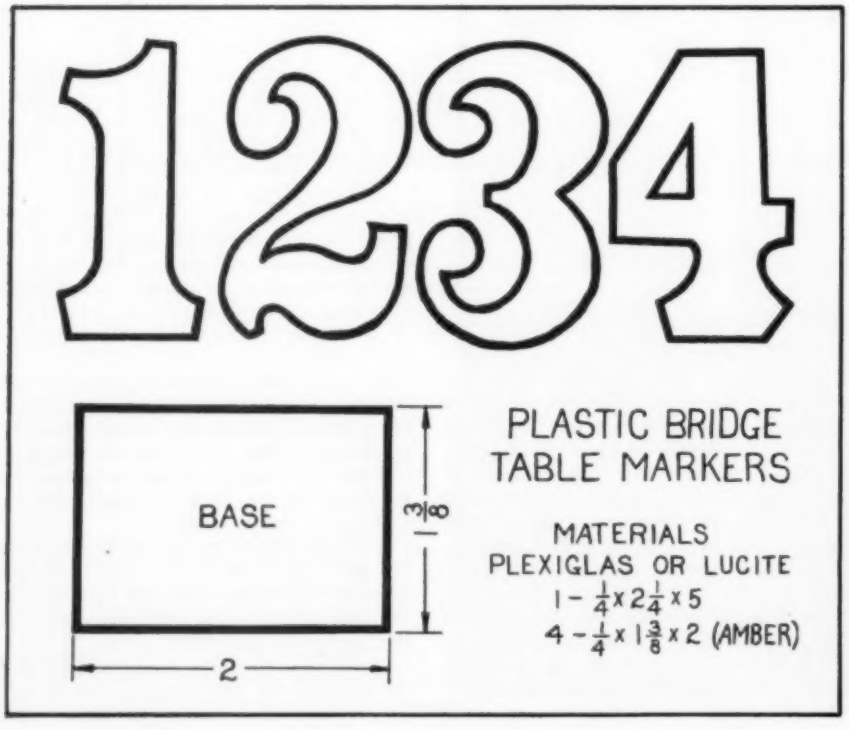

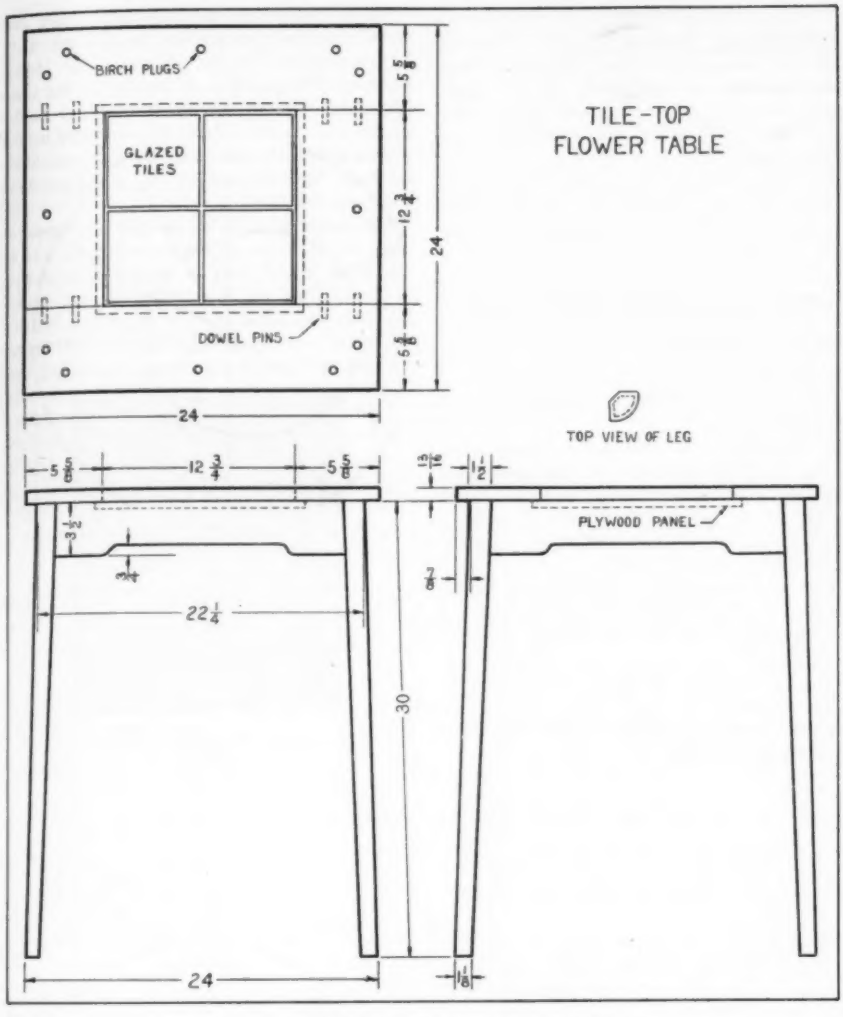

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7. All joints are rounded out with a smoothing tool and the excess filler wiped off immediately.
8. Sandpaper and steel wool are used to further smooth the joints after the filler is dry.
9. The joints are shellacked and varnished in the same order as the finish is applied.

Tiles vary a great deal in thickness and for this reason the recess in the top frame would of necesity have to be adjusted to meet the dimensions of the tiles used.

Finishing

Regardless of how well a project may be designed and executed, in the final analysis it is no better than the finish. A good finish on a project requires considerable study and effort so that all surfaces are prepared properly before assembly.

All parts of the tile-top flower table should be sanded with No. 1 garnet abrasive paper, followed by No. ½ grit and last with No. 2/0 grit. After the complete assembly, No. 2/0 grit garnet paper should be used on the entire project. The table should be thoroughly dusted and the following finishing procedure should then be used:

1. Apply a coat of 50/50 shellac (50 per cent 4-lb. white shellac and 50 per cent alcohol).
2. Sand with No. 3/0 grit garnet paper.
3. Dust.
4. Apply a second coat of 50/50 shellac.
5. Sandpaper with No. 3/0 paper.
6. Dust.
7. Apply a coat of clear rubbing varnish.
8. Hand rub with fine pumice stone and paraffin oil.
9. Wipe off all pumice stone and oil.
10. Wax with paste wax.

Summary

Industrial-arts laboratories with areas in wood and ceramics will find this table especially suitable for advanced classes. High school students in general shop could construct the table either with hand tools or power tools.

The table is definitely designed for a tiled area in the top. Without the tiles much of the table's usefulness and appeal would be lost.

SPUN ALUMINUM DESK LAMP

ARMIN F. GIMBEL
Metals Instructor
Southwest Missouri State College
Springfield, Mo.

In the selection of projects and work areas for our cold metals course, we included spinning as one of the areas, and this desk lamp as one of the projects. Spinning illustrates well the ductility of metals and also provides a fascinating type of work.

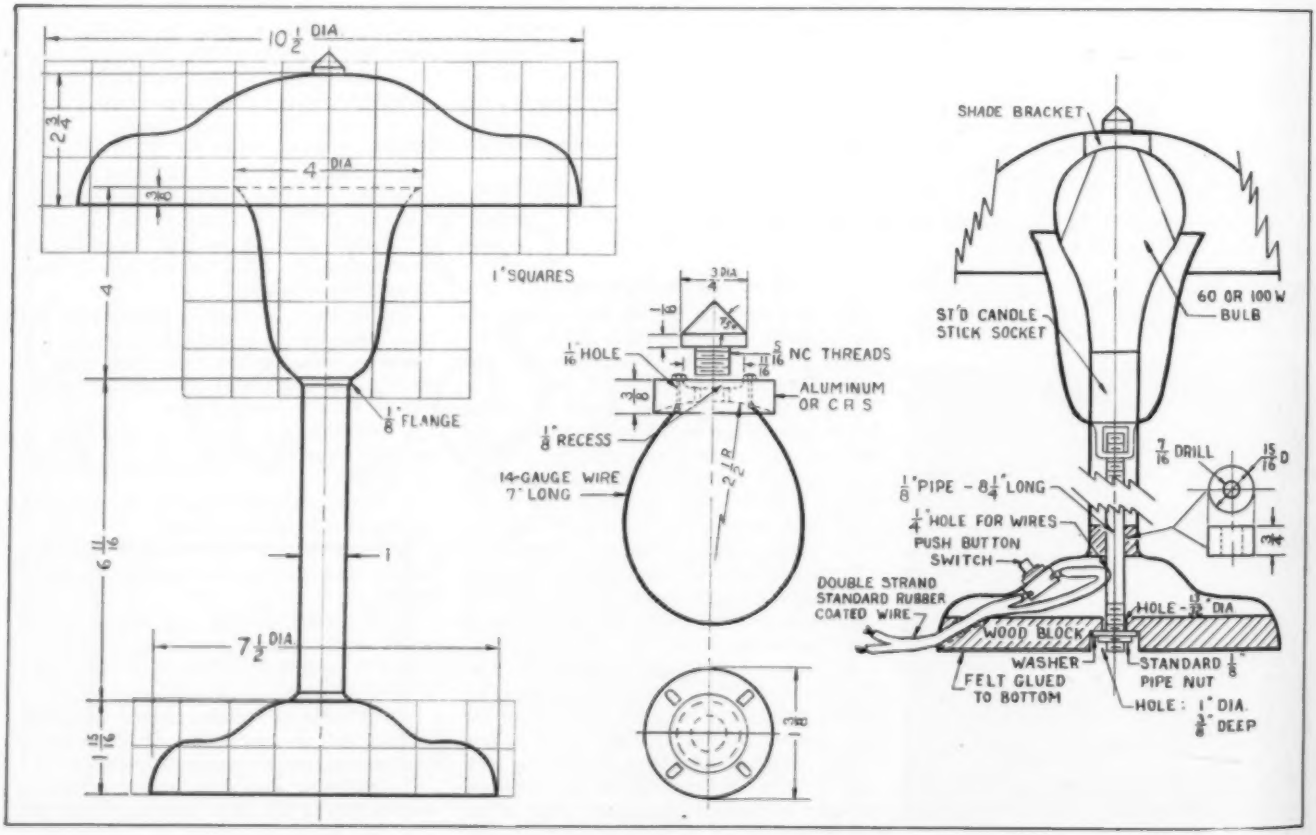
The lathe we use is an Oliver wood lathe; however, any substantial wood lathe will do. The spinning tools, chucks, chuck holders, tool rest, and live centers were made in our shop. The making of these items involves many operations in both wood and metal and the spun lamp provides a direct incentive for their construction.

For instruction in the tools needed and the actual spinning procedures, the student may be referred to H. V. Johnson's *32 Metal Spinning Designs*, The Bruce Publishing Co., Milwaukee, Wis., Ludwig's *Metal Work Technology and Practice*, McKnight and McKnight, Bloomington, Ill., Unit 56. We also presented the film, "Metal Spinning," by the Aluminum Company of America.

The spinning of the shade and base is quite easy, but the bulb cup is more difficult and a step-down chuck may be used to advantage.

The flanges on the lampposts are easily made by cutting a block of wood 1 in. thick, boring a 1-in. hole, then cutting the flange desired, splitting the block so as to admit the

Spun aluminum desk lamp



Details of spun aluminum desk lamp

post, placing the block in a vise and forming the flange with a ball-peen hammer.

The shade bracket shown involves some machine-shop practices. If the operations involved are not desired, a simpler type of bracket may be adopted.

We used a 240 grit aloxite emery cloth and kerosene to produce the finish we wanted. However, there are several other finishes such as the wire brush and buffed finish which may be used. A wheel of a knurling tool may be used to take away the plainness if a more ornate effect is desired.

Aluminum was chosen for this project because of its ease in handling. Many variations may be secured by using copper, plastics, or brass. Since aluminum is quite soft, we found it advisable to coat the entire project with a clear metal lacquer to prevent scarring the surface. If other metals such as copper or brass are used, increase the diameter of the disks by 1 in. since these metals do not stretch as much as aluminum does.

BILL OF MATERIALS

No. of pcs.	*Name*
1	9-in. disk, 18 gauge, 2SO aluminum
1	10-in. disk, 18 gauge, 2SO aluminum
1	12-in. disk, 18 gauge, 2SO aluminum
1	Aluminum tube 1 in. dia. by $6\frac{11}{16}$ in. long
1	Socket candlestick
1	⅛-in. pipe $8\frac{1}{4}$ in. long
1	Aluminum rod $1\frac{1}{2}$ in. dia. by 2 in.
1	Aluminum rod ¾ in. dia. by 2 in.
	14-in. by 14-ga. piano wire
1	Switch, push button type
6 ft.	Rubber covered fixture wire
1	Pony plug
1	Wood block ¾ by 8 by 8 in.
1	Washer 7/16 in. inside dia.
1	Felt 7 by 8 in.

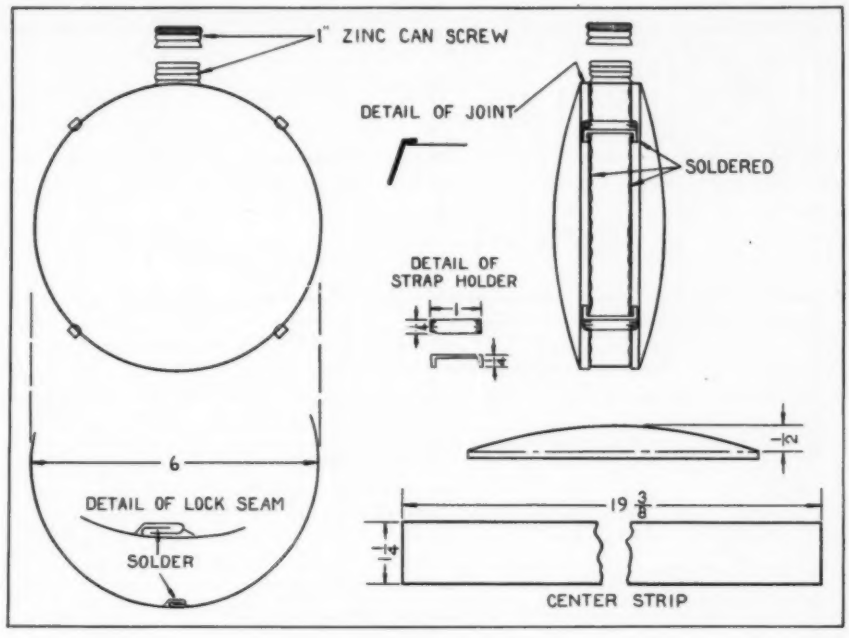
A BOY-SCOUT CANTEEN

J. L. DRENNAN
Instructor of General Shop
John C. Fremont School
Anaheim, Calif.

We needed a simple method for making a canteen in a general shop for boys in the eighth grade. We found by using the bottom ends of gallon cans the hardest problem was solved. To make this canteen you do not need the special tools found in most metal shops. The rolled edge on the can bottoms makes a very satisfactory edge for soldering the sides to the middle strip.

Steps in making the canteen:

1. Cut the bottom from two 1-gal. cans.
2. Raise the center of the lid about ½ in. A hollow block and a wooden mallet are quite satisfactory for accomplishing this.
3. Be sure to work carefully and remove all bumps so that a smooth surface is obtained.
4. Do the raising from inside the lid so there will be a good edge left on the inside for soldering.
5. Cut 2 strips $1\frac{1}{4}$ by 10 in., and put together to make one piece $1\frac{1}{4}$ by 20 in.
6. Fit to inside and cut strip to correct length. Leave enough for a lock seam.
7. Punch a ¾-in. hole in the center of the strip for the screw lid.
8. Solder strip on inside of one lid.
9. Solder remaining side to strip.
10. Place brackets as shown and solder in place.
11. Cut small pieces of parowax and put in canteen. Hold over fire to melt wax so inside gets coated.
12. Solder screw lid on canteen and clean up the project with No. 2/0 steel wool. We used the lids from old cans for this. New ones can be purchased.
13. Canteen may be covered with old felt or heavy cloth if desired.



Canteen project

ORNAMENTED LETTER HOLDER

DON L. DETWILER
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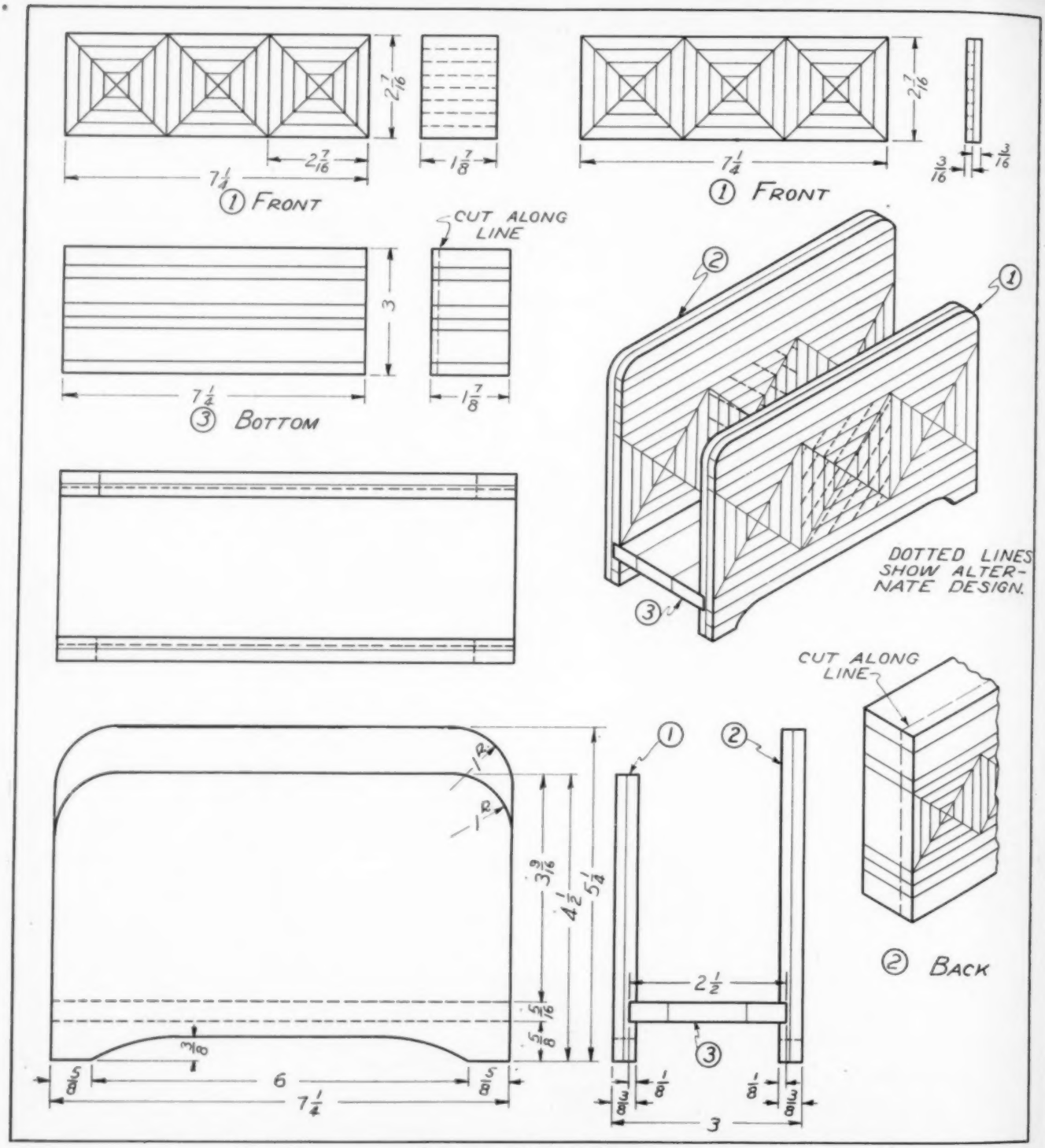
The methods employed in the design and construction of this ornamental letter holder are suggestive of many possibilities for the industrial arts and vocational woodshops or the home workshop. It involves a study in woods as to design and arrangement according to the individual's taste. In the industrial arts and home workshops, it is an ideal individual project while in the vocational classes where mass production is stressed and taught, this method can be readily adapted and the materials easily processed. Students who may be trained in this type of work may employ this idea in the manufacture of beautiful souvenirs.

Figure 1 shows the various stages in the building and arrangement of woods for the fronts, backs, and bottoms of the holder. The three squares are made individually by cutting 45-deg. triangular pieces to form the design for the front and back members. This is done by sanding the faces of the various pieces, and then rubbing them together with glue. The three squares made to the suggested size of 2 7/16 by 2 7/16 by 1⅞ in., are then glued together. When dry, ¼-in. thickness of the various woods are glued to the top and bottom surfaces until in the one case it is sufficiently thick to give the 4½-in. height and in the other the 5¼-in. height. The front and back surfaces are glued to the desired thickness of facing material (3/16 in. in this case), running the grain vertically. Pieces of this material ⅜-in. thick are cut from the glued surfaces longitudinally on the circular saw. The cut surfaces are sanded and cut as shown on the sketch giving either the front or backpiece of the holder. The remainder of piece No. 1 may be used for making another holder. The same procedure is followed in cutting pieces for the bottom of the holder. Time must be allowed for the glue to set properly before successive operations are carried out. The secret of making the facing of thin veneer of combined woods is not known to everyone. The idea is simple and can



Ornamented letter holder

be utilized in other useful pieces of furniture. The veneered slabs may be made any thickness to suit the piece of furniture being made.

Machine Tools

The machine tools required for this article are a circular saw, jointer, and disk sander.

The materials required are: two or more different colored woods, glue, lacquer, varnish, or shellac.

It should be noted that the glued-up face material is backed up by one piece of lumber with the grain running vertically. This strengthens the pieces and makes a lasting, serviceable, job.

Procedure

1. All center squares are glued up first as single units.
2. Connect the individual squares with glue.
3. Add the required strips of wood to the glued-up center squares to form the whole face. This mass may be as thick as de-

sired and in accordance with the number of letter holders being made.

4. Dress both back and front true on jointer or disk sander. Back has same design as the front.

5. Glue one single piece of lumber on the front and one on the back surfaces, running the grain vertically, taking care to clamp well to get good joints.

6. Saw off on circular saw a slab from the front and back and repeat No. 5 operation as long as the designed material lasts.

7. Cut slabs to the required length and width.

8. Groove the pieces on the circular saw.

9. Sand the slabs and cut in the bottom curved design as well as the top corner curves.

10. Glue the three parts of the letter holder together and check closely for squareness.

11. Sand the ends of the glued up letter holder true on the disk sander.

12. Carefully remove all feathered edges and scratches with sandpaper.

13. Finish as desired. Natural paste wood filler will, if properly applied, form an excellent surface for the application of varnish or lacquer.

14. If possible, spray the holder to insure an even, glossy finish.

DISPENSING AND STORAGE RACK FOR SOFT ROLLED COPPER

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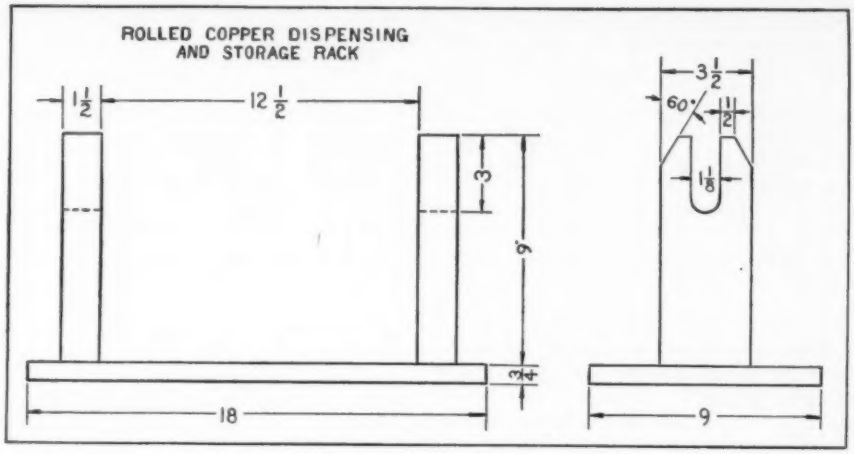
El Monte, Calif.

The handling and storage of soft rolled copper presents a real shop problem. Light gauge copper is easily bent, dented, and otherwise mutilated, when the roll is merely placed on a shelf. Rolls of copper which are stored on the rack described herewith, can be lifted by gripping the conduit pipe, which is placed in the center of the roll, without mutilating the edges of the copper. The copper can be cut by placing the rack near the squaring shear and unrolling the copper directly into the squaring shear.

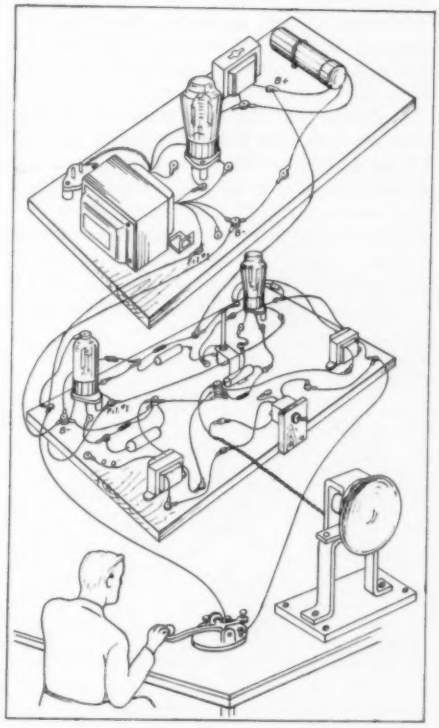
The insert for the center of the copper roll can be turned on a wood lathe, or obtained from the inside of a roll of wrapping paper.



Details of rolled copper dispenser

The materials needed for the construction of this rack are:

No.	*Name*	*Material*	*Size*
1	Base	Pine	¾ x 9 x 18
2	Uprights	Plywood	1⅝ x 3⅝ x 9
4	Wood screws	F.h.b. wood screws	No. 10 x 1¾
1	Conduit pipe	Conduit	¾ x 22
1	Wrapping paper roll insert		



Code oscillator

EDUCATIONAL ELECTRONICS

JOHN N. WILLMOTT,
ROBERT L. WHITTLE, and
THOMAS D. MINER
Public Schools
Garden City, N. Y.

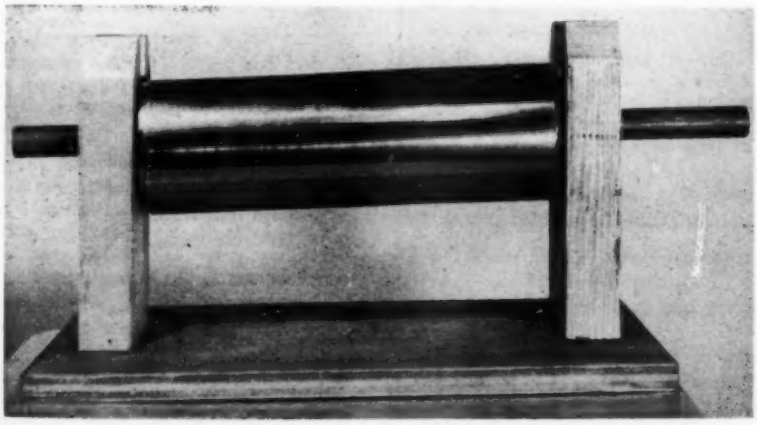
(Continued from page 162 of the April, 1950, issue)

The Code Oscillator

With the addition of a transmitter key, and 16 Nu-Way snap fasteners, plus a minor circuit change, the *audio amplifier* may be used as an oscillator for code practice.

1. Test the audio amplifier to make sure that it is in proper operating condition.

2. Remove the wire connecting this unit to the RF amplifier, if this connection was originally in place.



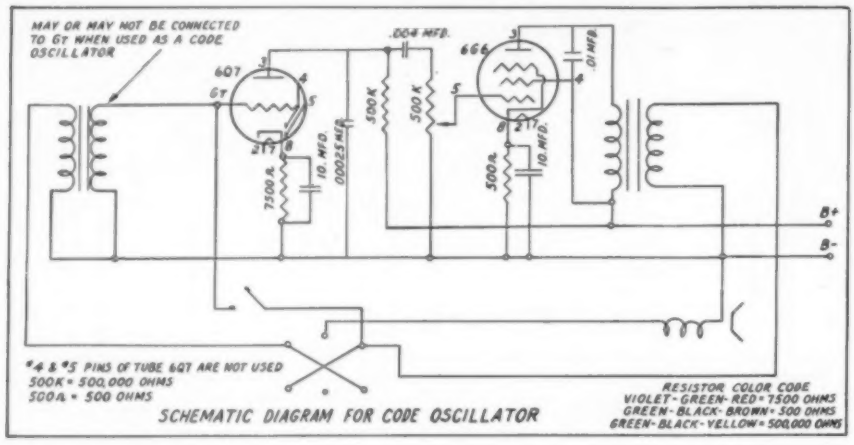
Rack and dispenser for soft rolled copper

3. Disconnect one of the speakers, and put the toggle switch in position so that the other one is properly connected, as a speaker.

4. Run a connecting wire from the grid of the 6Q7 to the green wire from the primary of the *input* transformer, and ground the yellow wire from the primary.

5. Attach one of the leads from the key to the grid of the 6Q7, and the other wire from the key to the side of the *output transformer secondary which is not grounded.*

6. Advance the volume control about halfway, and turn the set on. You should hear a distinct note when the key is closed. If not, check all connections, make sure that the switch is in the correct position to operate



SCHEMATIC DIAGRAM FOR CODE OSCILLATOR

the speaker, and vary the position of the volume control keeping the key closed. If everything appears to be properly connected, and you still get no result, reverse the grid and ground connections to the input transformer.

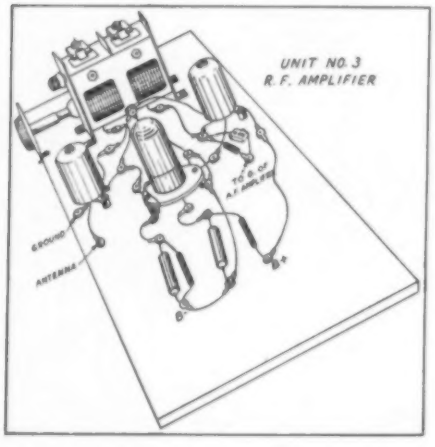
7. Notice that the position of the volume control affects both the loudness and the pitch of the note. In general, the best note to use is rather high pitched, and of medium loudness. The .01 mfd. condenser connected from plate to screen of the 6G6 tube has a marked effect on the pitch of the note. If, because of some variation in the components of your code oscillator, you cannot get a good clear note of the right pitch, a different value of condenser may be tried in this place. A lower capacity will give a higher pitch, and vice versa.

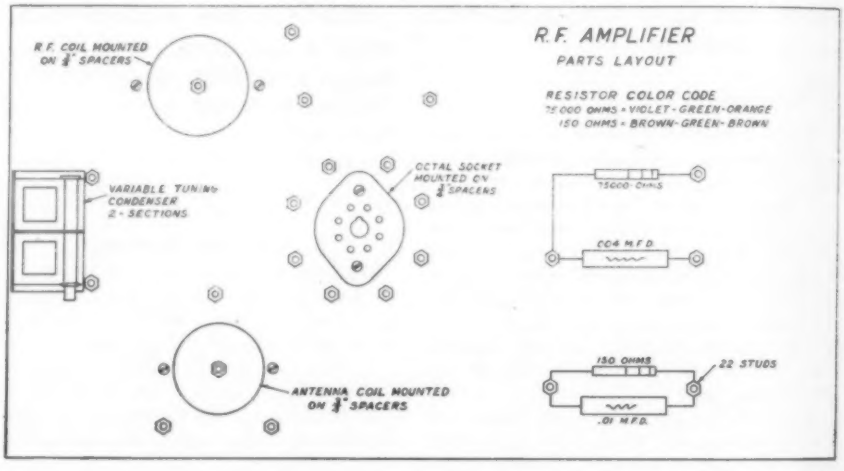
8. A table of the code characters is given on page 682 of Marcus and Horton.* The Radio Amateur's Handbook contains a very helpful section on learning the code. The best system to use is described in the American Radio Relay League's booklet "Learning the Radio Telegraph Code."

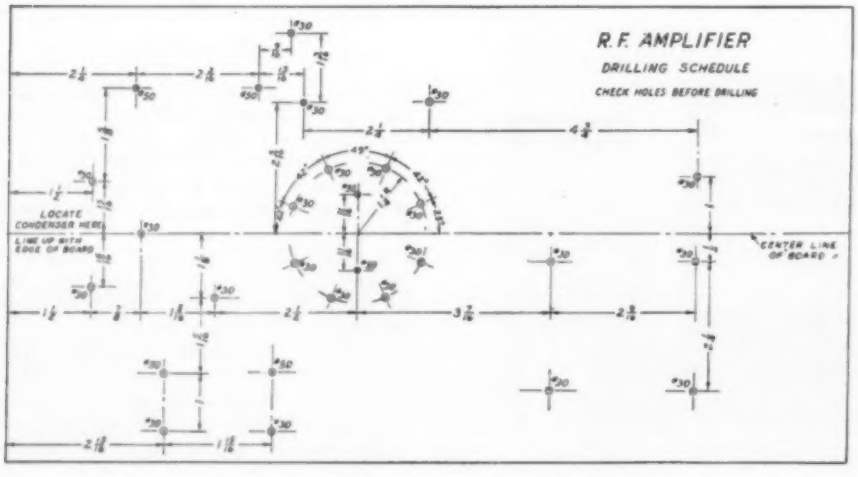
Experiment No. 1 — Tracing the Circuit

1. The purpose of this experiment is to become familiar with the circuit of an RF amplifier, and to identify the various components. You should keep the schematic and parts placements diagrams before you while you work, and refer to them frequently. Keep a record of the experiment in your notebook while you are doing it.

2. Make a list of the following parts, and to the right of the list rule four vertical lines, so that you have three columns after the list, giving three spaces to fill in after the name of each part. Label the first column *Symbol*, the second one *Value or size*, and the third *Other Facts*. Then for each part record this information. Get it from the schematic, from the part itself, or from the instructor. There is a table of symbols on pages 676–677 of Marcus and Horton, and a resistor color code explanation on pages 679–680.





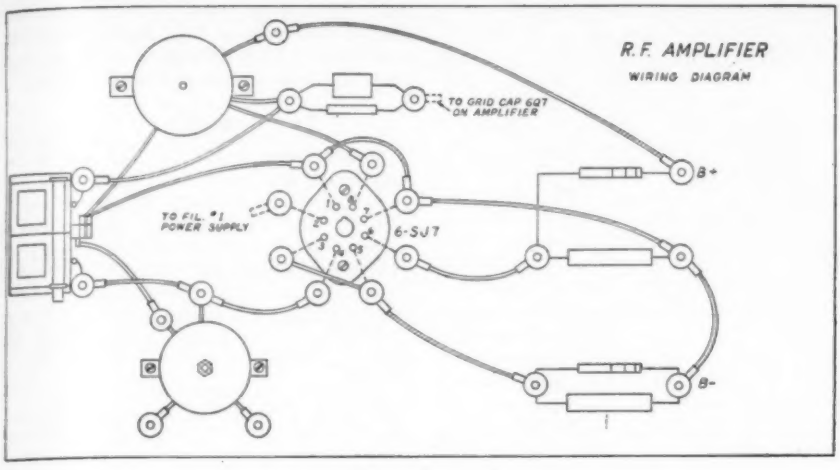


1. Antenna coil (or antenna coupler)
2. Turning condenser
3. Pentode — 6SJ7
4. Cathode resistor
5. Cathode by-pass condenser
6. Screen resistor
7. Screen by-pass condenser
8. RF coil (or RF transformer)
9. Grid leak resistor
10. Grid condenser

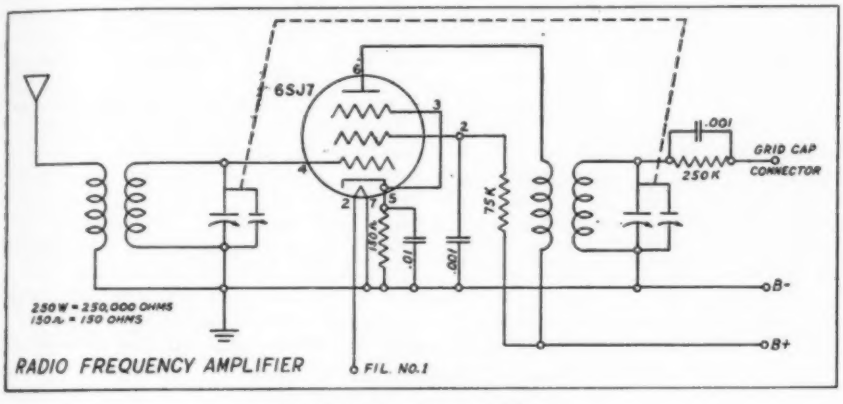
PARTS LIST FOR RF AMPLIFIER

1 Variable tuning condenser, 2 sections, 365 mmfd. per section (approx. 23 plates per section) with trimmers attached
1 1½" to 2" tuning dial with knob for variable condenser

*Published by Prentice-Hall, Inc., 70 Fifth Ave., New York City.



R.F. amplifier wiring diagram



Radio frequency amplifier

1 Shielded RF Coil-Meissner No. 14 — 1025 or Carron No. S 373
1 Shielded Antenna Coil-Meissner No. 14 — 1024 or Carron No. S 372
4 Flat mounting lugs for coils
6 Spacers for mounting coils and socket above breadboard, ¼" dia. by ¾" lg to pass No. 6 R.H.B. wood screws
1 Wafer octal socket, standard size, laminated fiber
1 Fixed paper condenser, .01 mfd. — 400 volts
1 D:Ho, .004 mfd., 600 volts
1 Mica condenser, .001 mfd.
1 Fixed resistor, 75,000 ohms, 1 watt
1 Fixed resistor, 250,000 ohms, ½ watt
1 Fixed Resistor, 150 ohms, ½ watt
28 "Nu-Way" snap fasteners
19 "Nu-Way" studs
1 6SJ7 — GT vacuum tube

3. For each of the parts listed above, check its connections in the circuit, and compare every wire with those shown on the schematic. Make another list of the parts (omit the tube), and after each one, tell exactly what it is connected to.

Report

1. Make the two lists required in the experiment.

2. Note that both the antenna coil and RF coil are air-core transformers. (Marcus and Horton, sections 57–59). Tell two ways in which the construction of an air-core transformer differs from that of the usual type of power transformer.

3. Why are the antenna and RF coils each enclosed in a metal can? (Marcus and Horton, sections 155–158.)

4. What are three necessary parts for any condenser? Tell what these parts are in each of these three condensers: (1) the cathode by-pass condenser; (2) the grid condenser; (3) the tuning condenser.

5. What does the capacity of a condenser depend on? (Marcus and Horton, section 29.)

6. How is the capacity of the tuning condenser varied? What is meant by *ganging of variable condensers?* (Marcus and Horton, section 164.)

7. What is the purpose of a trimmer? (Marcus and Horton, section 165.)

Experiment No. 2 — Voltages in the RF Amplifier

(*Reference* — Marcus and Horton, Chapter 23.)

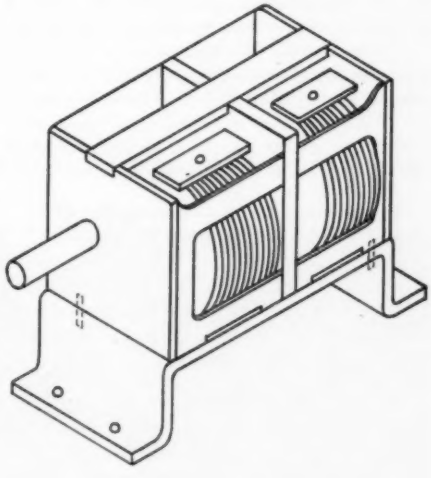
1. Be sure that you are familiar with the use of the neon tester. Connect it to the 110 *v* power line. Note whether one or both plates are lit, and also their brightness. Then connect it from B+ to B— on the power supply (300 *v*) and again make the same observation. How can you tell (*a*) approximate voltage, (*b*) a.c. from d.c., (*c*) positive from negative?

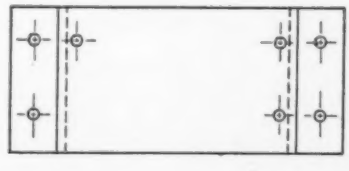
2. Use the tester to investigate voltages in the RF amplifier. Connect one lead to ground, and connect the other lead to heater, cathode, screen grid, and plate in turn, with the set turned on. For each, note and record the polarity, and approximate magnitude of the voltage. Remember that if the tester does not glow at all, the voltage may be too low.

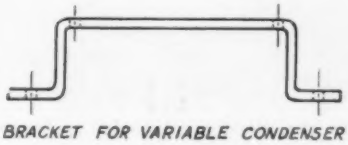
3. Remembering that electrons flow from minus to plus, trace the flow of current from B– (ground) through the 6SJ7 to B+. Refer to the schematic. What must be the polarity of the cathode with respect to ground? In view of the size of the cathode resistor, do you think the cathode voltage is very great? What are the two current paths to B+ from the tube cathode?

4. Compare the voltage on the plate with the B+ supply voltage. Through what part is the plate connected to B+? Compare the screen voltage with B+. Through what part is the screen connected to B+? Now connect the neon tester from B+ to screen so that it is showing the voltage across this component. Note the polarity and size carefully.

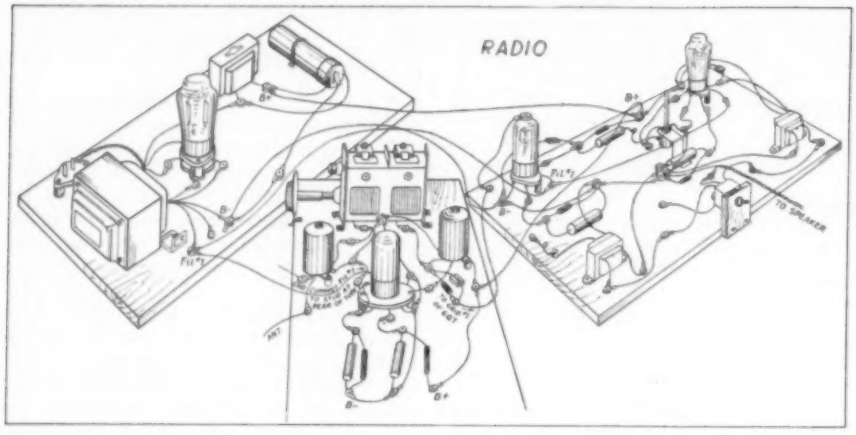
5. Tubes should usually be operated at their rated heater voltage. However, it is instructive to notice the effect of a reduced voltage. Adjust your set so that it is operating properly, as a radio with a station tuned in.







BRACKET FOR VARIABLE CONDENSER



Then disconnect the wire which supplies the heater voltage to the 6SJ7. How do you explain the result? Connect it now to the center heater terminal on the power supply (the one with the double green wire from the power transformer). Refer to the power supply schematic to see exactly where this connection is. What voltage are you now supplying to the heater? How does the set work?

Report

1. Record all of the results in this experiment, and answer all the questions.
2. Explain the results you got in paragraph 4. What is the purpose of the screen resistor?
3. In view of your observation in part 5 of this experiment, explain why most radio sets do not work as soon as they are turned on.
4. The pentode is so called because it has five elements. Name them, and tell the purpose of each. (Marcus and Horton, Sections 206–211.)
5. What is the purpose of the cathode resistor? (Marcus and Horton, Section 134.)

Experiment No. 3 — Tuning the RF Amplifier

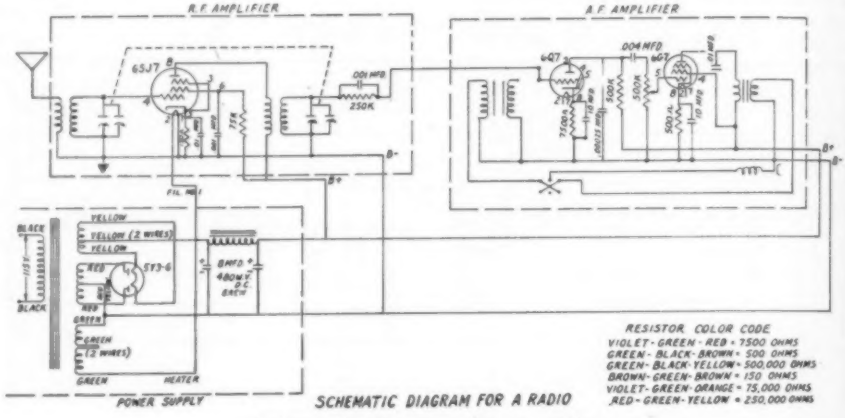
(Reference — Marcus and Horton — Chapter 12.)

Note: You will need a copy of today's local paper, giving radio programs, stations, and frequencies for this experiment.

1. Adjust the tuning dial on the variable condenser so that as you change the condenser from highest capacity (plates completely meshed) to lowest capacity (plates all the way out), the numbers on the dial from 0 to 100 pass some fixed point on the edge of the board. A pencil mark may be made on the board to refer to.
2. Tune in a station near minimum capacity of the tuning condenser. By referring to the radio programs, identify the station. If you cannot tell what station it is from its program, you may have to wait for an announcement. What is its frequency?
3. Now tune in and identify a station near maximum capacity of the condenser. What is its frequency?
4. Tune in and identify as many stations as you can, starting at one end of the dial, and working toward the other. For each one, record its frequency and your dial setting.
5. The trimmers (explained in Marcus and Horton, Section 165) are the small square condensers mounted on the side of each of the tuning condensers. Each is controlled by a screw which passes through its center. Turning the screw clockwise increases the capacity. Increase the capacity of each trimmer to its maximum, and tune in a station near the open position of the main tuning condenser. Compare the dial setting with that previously recorded for the same station. Repeat with the trimmer screws out part way by about the same amount.
6. Screw one of the trimmers all the way in, and the other all the way out. You have now thrown the tuning *out of alignment*. How does the receiver work?
7. Align the receiver by adjusting the trimmers so that the highest frequency station you can receive comes in with maximum volume, and without any squeals. Test the receiver over its whole tuning range, to make sure that it is operating normally again.

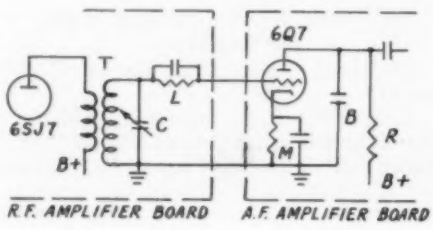
Report

1. Record the results of each step in the experiment, and answer all of the questions.
2. Refer to your results in steps 2 and 3, and tell how the frequency of the station received is determined by the capacity of the tuning condenser.
3. What is meant by "resonance"?
4. How does a radio set select one station out of all of the signals picked up by the antenna?
5. What is the purpose of a trimmer?
6. What is meant by *aligning a receiver?*



SCHEMATIC DIAGRAM FOR A RADIO

Schematic diagram for a radio

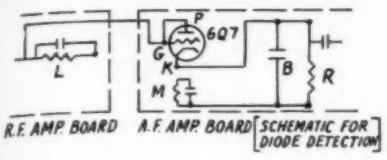


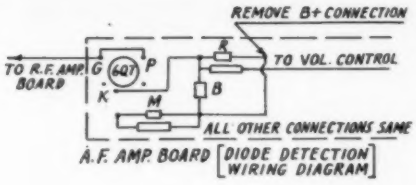
7. Explain the results you obtained in step five.
8. (Optional) Draw a graph of the results of step 4, plotting dial setting against frequency.

Experiment No. 4 — Detection

(*Reference* — Marcus and Horton, Sections 39, and 40; Chapters 14 and 15.)

1. Study the circuit diagrams of the RF amplifier, and the audio amplifier together. When they are used togther as a radio, the 6Q7 triode on the audio amplifier board functions as a detector. Note that its grid circuit is on the RF amplifier board. Trace out the circuit as it is shown in this diagram. In the set itself, locate the grid-leak resistor (L on the diagram), the tuning condenser (C), the RF transformer (T), the cathode resistor and condenser (M), and the RF by-pass condenser (B).
2. Trace the path of the signal from the plate of the 6SJ7 to the grid of the 6Q7.
3. The cathode resistor and condenser (M) are included in this circuit mainly because they are necessary when the unit is used as an audio amplifier for a public-address or intercommunication system. To show that they are not needed for detection, connect a short piece of wire directly across M, so that the tube cathode is grounded. Test the opera-





tion of the set on both a weak station and a strong station. Do you notice any difference?

4. Disconnect one end of the RF by-pass condenser, and notice how the set works when you tune it, and also when you adjust the volume. The function of this condenser is explained in Marcus and Horton, Section 162.

5. The type of detection you have just investigated is called *grid-leak detection.* It is very sensitive, and provides amplification as well as detection, but it is not commonly used in modern radios because of the distortion it introduces. The most usual method of detection used today is *diode detection* (Chapter 14 and Figure 67). In order to try diode detection in your set, make the following changes, after turning the set off:

a) Remove the B+ connection from the plate resistor of the 6Q7. Thus the only B+ connection to the audio amplifier is for the 6G6.

b) Disconnect the plate of the 6Q7 from its plate resistor (R) and connect it instead to the same stud to which the grid is connected.

c) Disconnect the cathode of the 6Q7 from its usual resistor (M), and connect it instead to the end of the plate resistor (R) nearest the tube.

d) Change the position of the RF by-pass condenser (B) so that it now goes from cathode to ground.

e) Ground the other end of the plate resistor (the end usually connected to B+).

f) On the RF amplifier, change the lead which goes to the audio board to the other side of the grid leak (L).

g) Now compare your circuit with these diagrams, and see that you have made all the necessary changes.

When you are sure that you have all of the connections exactly right, turn the set on. You will need to readjust the trimmers to get the best results. Compare results with those obtained when the set is used normally, as to loudness, quality, and the number of stations you can receive.

6. Restore the circuit to normal, and test to make sure that it is operating correctly.

Report

1. Record all of the results you obtained in the experiment.

2. What is the nature of the signal coming from the tuning circuit to the grid leak? Draw a diagram of it. See Figure 30 in Marcus and Horton. Why can this not be used to operate the audio amplifier directly?

3. Explain what is meant by *detection.*

4. What is the purpose of the grid condenser?

5. What is the function of the grid leak?

6. What is the nature of the signal which appears at the plate of the 6Q7? Draw a diagram of it. See Figure 69C in Marcus and Horton. Explain the fact that this can be used to operate the audio amplifier.

7. Why does grid leak detection give louder signals than diode detection?

(To be continued)

SAFETY GOGGLE PROGRAM IN THE SCHOOL SHOP

JOHN L. HOPKINS

Superintendent of Schools
Hastings-on-Hudson 6, N. Y.

The board of education of Hastings-on-Hudson, N. Y., upon recommendation of Superintendent John L. Hopkins, has instituted a Safety Goggle Program in the school shops. Upon entering the metal or wood shops, each student goes to a cabinet, takes his goggles, and wears them throughout the shop period. Instructors wear safety goggles. The superintendent and principals when entering the shops put on their goggles. These goggles are really bow-glasses made of shatter-proof glass. They are similar in weight and appearance to regular glasses. The goggles are purchased by the board of education, including prescription glasses. They are furnished by the Kimball Safety Products Company, 1714 Wade Park Avenue, Chicago, Ill. They are fitted by the school nurse, assisted by the shop instructors, under directions of the company. Hastings High School is the first in the United States to adopt this 100 per cent safety goggle program.

The Wise Owl Club is a feature of the program. Dr. Franklin M. Foote, director of the National Society for Prevention of Blindness, 1790 Broadway, New York, N. Y., appeared at a high school assembly in October and presented a charter of membership in the National Wise Owl Club.

The wearing of safety goggles and the Wise Owl Club are now featured by many industries throughout the nation. To become a "Wise Owl," a student or industrial employee must offer evidence of a damaged pair of goggles and other corroboration that prevention of serious eye injury was due to wearing safety goggles. As of April for the school year 1949–

Teacher and students use safety goggles

50, no eye accident has been reported from the school shops. In previous years, a number of students had to have steel particles or dust removed from their eyes.

The goggle program is part of an over-all shop safety program. Machines and shop conditions are carefully inspected. High visibility yellow lines guard each machine. Hazardous machine parts are painted different colors according to the industrial safety color code.

Safety is taught in units of study throughout the elementary and high school curricula, including automobile driver education. The Hastings schools were fortunate in the introduction of the shop safety program in having access to safety practices in the shops of the American Car and Foundry Company. Spencer B. Hopping, of the Hastings Board of Education, is associated with the safety division of that company and was instrumental in giving encouragement and assistance in introducing the program.

PLASTIC AND METAL IVY HOLDER

WARD J. PARKS
Oswego State Teachers College
Oswego, N. Y.

Here is a project which utilizes a maximum of operations and a minimum of materials. Either thermosetting or thermoplastic sheets may be used.

Each part of this project can be developed from templates, thus making it practical for junior high school students and lower grade levels.

In construction of the project it is advisable to make the required templates from 20-gauge sheet metal or plywood.

Step One: Use template No. 1 and cut the ivy holder mounting back from any ¼-in. sheet of Garalin or Plexiglas that would blend with your wall. Drill the necessary mounting and hanger holes. Finish edges by filing and sanding; buff over all.

Step Two: Use template No. 2 and cut the ivy holder front from 22-gauge copper or brass sheet. Finish all edges by filing.

Step Three: Use template No. 3 and cut the ivy can back from sheet tin being careful to leave a small tab for a better fit when soldering.

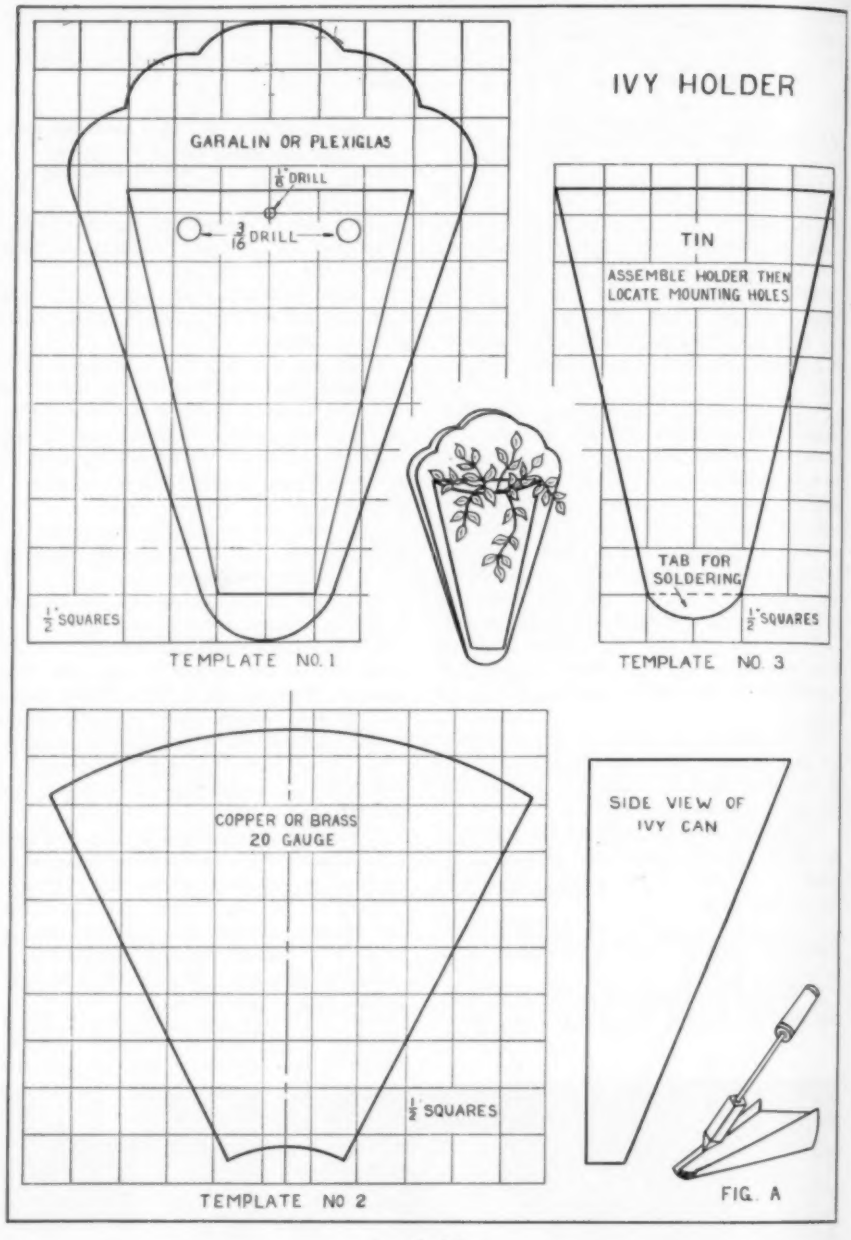
Step Four: Solder pattern No. 3 to pattern No. 2 as shown in Figure A, until can is waterproof.

Step Five: Buff soldered can front and lacquer.

Step Six: Put completed can on plastic back and spot mounting holes.

Step Seven: Drill mounting holes in can back and assemble ivy holder can to plastic back with 5/16 by ⅜-in. flathead stove bolts.

Several variations of this idea could be obtained by cutting more than one color of overlapping plastic backs. For instance, a bross holder mounted on a yellow plastic panel, backed with another panel of ebony Garalin looks very striking. Brass or copper holder mounted on transparent Plexiglas looks well on any wall.



Ivy holder

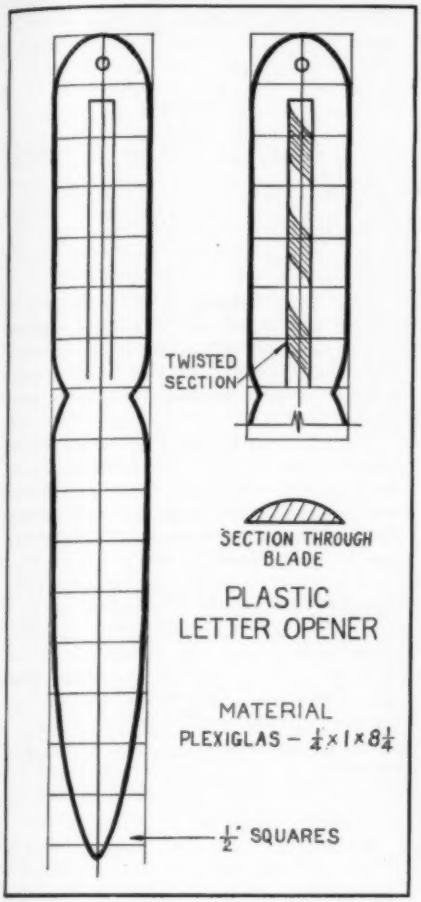
PLASTIC LETTER OPENER

FRANK A. THOENDEL
Assistant Professor of Industrial Arts
Nebraska State Teachers College
Chadron, Neb.

Most shop teachers are confronted with the problem of cost of materials when working with plastics. The cost of each project must be kept at a minimum, yet interesting and useful articles must be made that involve the necessary learning processes. The letter opener described herewith meets many of these requirements. The cost of this project is less than 15 cents. Working processes involved are: laying out, cutting out, filing, bending, drilling, sanding, and polishing. If different colored Plexiglas is used, and each student is given his choice of color, interest in making this project is very high.

Procedure

A template is made from cardboard and then transferred to the masking paper on the Plexiglas. The shape is sawed out with a coping saw or jig saw. A wood file is then used to true up the edges to proper shape. A twisted

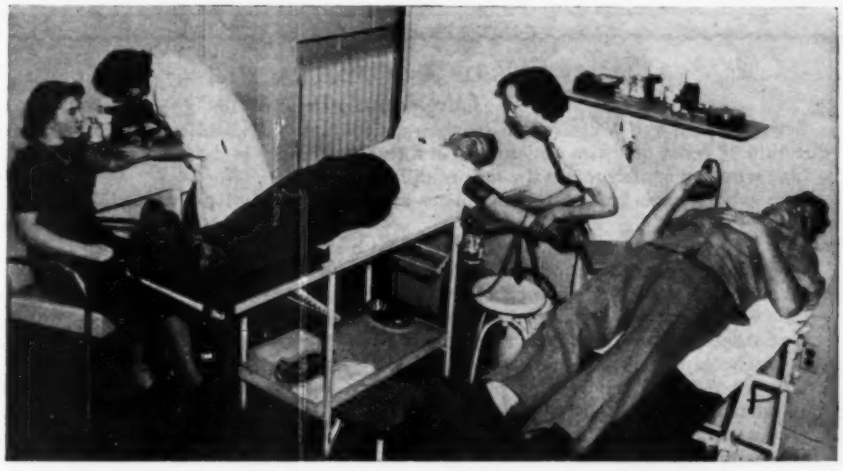


effect in the handle is made by cutting the inner section on three sides with the jig saw. Be sure not to cut the base portion of this area. The masking paper is removed and the letter opener is placed in an oven (250 deg. F.) until pliable. The inner section of the handle is then twisted until the desired effect is secured. It must be held in this position until the plastic has cooled. The blade of the opener is shaped with a wood file. The edges and blade are sanded with 120 grit wet and dry sandpaper followed with 360 grit. It is then polished on a muslin buffing wheel using plastic rouge. A coat of glass wax is finally applied to protect its finish and to prevent scratches.

CLOVER PARK HAS A BLOOD BANK

CARLIN ADEN
Director, Adult Education
Clover Park High School
Tacoma, Wash.

Since September of 1949, the Clover Park High School has maintained a blood bank on a simple, practical basis which should interest other schools where a similar program is possible.



Actual donation of blood is a serious business but the students are pleasantly surprised that it is not painful. (Photos by J. Edward Trimble)

The Clover Park blood bank was created in response to an emergency request from the Pierce County bank for donors in an emergency involving a former Clover Park student. This request was handled by Marion Oppelt, Clover Park director of guidance. The reply among the older students who were contacted was so favorable that Mr. Oppelt put the donations on a permanent basis as a function of the guidance department.

In the establishment of the system, a working agreement was reached with the county blood bank. In exchange for the use of county equipment, storage facilities and technical experience, Clover Park was to give to the county all surplus plasma above the four or five units monthly needed by the school for a proper reserve.

The regulations governing the school program are standard: Donors must have had no major surgery during the previous year; there must be no history of jaundice or ulcers; blood pressure must be within the limits 100–160; students must be eighteen years of age and have parental permission.

The age limitation has been of value in helping the guidance department to establish rapport with the older student group. Some of these older students, especially if they have never been outstanding in scholarship or athletics, tend to lose contact with the school program. By becoming blood donors such students gain the satisfaction of contributing to the group welfare. This contribution is not based on intellectual or physical competition but nevertheless is an honorable one which establishes the maturity of the donor.

At the present time thirty-five boys and fifteen girls are available for donations which are limited, individually, to one every three months. The supply of plasma being obtained is enough to be of real value to the county as well as the school.

While the primary function of the Clover Park Blood Bank is the storage of emergency plasma, nevertheless the secondary features are important from an educational standpoint. In addition to giving a sense of personal value to the comparatively small number referred to above, it is giving to a much larger group a personal sense of civic responsibility which, as far as society is concerned, may prove more useful than plasma.

ZIRCONIUM

Element No. 40 is zirconium (Zr).

This minor element is most popular as a gem stone—the zircon.

Pure zirconium readily combines with oxygen, nitrogen, carbon, and silicon—because of its great affinity for oxygen it is used as an oxygen getter in electric bulbs and as a corrosion inhibitor in mercury boilers. It is alloyed with aluminum as a deoxidizer with nickel for cutting tools; in copper alloys for improving the tensile strength without appreciably lowering the electrical conductivity. It is used to deoxidize brass and bronze to improve the hardness and strength of these metals. Zirconium is also used as an alloying element in steels, improving the ductility and machinability.

It is available in powder form, and alloyed with aluminum, copper, and nickel.

The oxides of this element are used in ceramics and fire brick. Zirconium weighs .23 lb. per cu. in., and melts at 3097 deg. F., and has a specific gravity of 6.37, and an electrical conductivity (% Ag.) of 3.95.

There were 93,000 more persons injured in U. S. motor vehicle accidents in 1949 than in 1948. — *The Travelers,* Hartford, Conn.

QUALITIES OF A GOOD TEACHER

Lafe Nelson*

Several years ago a classroom teacher with whom I had differed asked me this question: "What qualities do you like in a teacher?" Here is the answer I gave him:

One who can smile even in the face of difficulty
One who comes before school opens and sticks around a little while after it closes
One who knows what he is going to do when he enters the classroom
One who is sincerely concerned with every child assigned to him
One who is concerned when others have misfortune
One who is adequately trained professionally and academically
One who can revel in another's success
One who can analyze constructively his own weaknesses and faults
One who knows the laws of physical, mental, and moral health and lives them methodically
One who deliberately attempts to constantly broaden his interests
One who loves to teach
One who by nature is friendly
One who is willing to give more than the prescribed minimum
One who is religious and is concerned with the fundamentals of Christian life
One who is tolerant of others
One who has definite ideas and ideals or vision for himself and his students
One who sees the good in others
One who commends the good he sees in others
One who is clean in body and mind
A regular person
A wholesome person
One who is definite in speech and action
One who has developed method
One who plans ahead
One who can take suggestions and act on them for his self-improvement
In short, a good teacher is simply a good Christian, a good American, a good neighbor.

*Superintendent of Schools, Safford, Ariz.

HARDWOOD LUMBER

Practically all kinds of lumber for industrial arts use, with the exception of white pine, come under the classification of *hardwood*.

The National Hardwood Lumber Association has established rules for grading hardwood lumber and the grades are recognized by the manufacturers, distributors, and dealers.

In the manufacturing of hardwood lumber, there is no attempt made to cut stock into specified widths and lengths. If a slab can be cut 11 or 13 ft. long, there is no reason to trim off one foot in order to make it an even length. In width, a slab is trimmed to any width in order that the finished board shall have square edges or edges which shall be permitted within the grade. In construction or common building lumber, there is a definite reason to have all in standard widths and lengths.

It would be impossible to give all of the details in connection with grading hardwood lumber; in fact, the National Hardwood Lumber Association has a school for this purpose and it requires about five or six months to complete such a course. This course requires the actual handling and inspection of the various kinds of hardwood lumber. This school is located in Memphis, Tenn.

The grade of hardwood lumber most commonly used in industrial-arts work is known as F.A.S. or sometimes written as 1s & 2s both of which mean firsts and seconds.

Kiln Drying of Hardwood Lumber

Hardwood lumber for cabinet and furniture use must be kiln-dried. This means that the lumber must be actually dried with the use of heat in order to remove the moisture to a content suitable for the use intended. It is generally recognized that the moisture content shall be between 5 and 9 per cent.

Thickness of Rough and Surfaced Lumber

Many instructors prefer to purchase their lumber in the rough but many shops do not have the facilities for surfacing and, therefore, purchase their lumber surfaced. It is quite possible that the instructor would like part surfaced and part rough. In this case, it is recommended that each item of lumber be specified either as *rough* or *surfaced*.

A schedule which shows the thickness of lumber in the *rough* and the *finished* thickness if it is to be surfaced two sides is as follows:

Rough	*S2S (surfaced two sides)*
3/8"	1/4"
1/2"	3/8"
5/8"	1/2"
1"	3/4"
1 1/4"	1 1/8"
1 1/2"	1 3/8"
2"	1 3/4"
2 1/2"	2 1/4"
3"	2 3/4"
4"	3 3/4"

Square Stock

Rough	*S4S (surfaced four sides)*
1 1/4 x 1 1/4"	1 1/8 x 1 1/8"
1 1/2 x 1 1/2"	1 3/8 x 1 3/8"
2 x 2"	1 3/4 x 1 3/4"
2 1/2 x 2 1/2"	2 1/4 x 2 1/4"
3 x 3"	2 3/4 x 2 3/4"
4 x 4"	3 3/4 x 3 3/4"

With the foregoing brief description of grading, kiln-drying, and the finished thickness of surfaced and rough lumber, it is recommended that specifications for a typical requisition or order of hardwood lumber be specified as follows:

"For all of the lumber listed as follows, the quality must be F.A.S. under National Hardwood Lumber Association rules. It must be in random widths and lengths and to be thoroughly kiln-dried to a moisture content suitable for cabinetwork."

1. 200 bd. ft. 3/8", ash, S2S.
2. 200 bd. ft. 1/2", basswood, S2S.
3. 200 bd. ft. 3/4", birch, S2S.
4. 200 bd. ft. 1 1/4", cherry, rough.
5. 200 bd. ft. 1 1/2", Philippine mahogany, rough.
6. 200 bd. ft. 2", hard maple, rough
7. 200 bd. ft. 2 1/4", yellow poplar, S2S.
8. 100 lin. ft. 2 3/4" x 2 3/4", plain red oak, S4S.
9. 100 lin. ft. 4" x 4", plain white oak, rough.
10. 100 lin. ft. 2" x 2", plain red gum, rough.
11. 100 lin. ft. 1 3/4" x 1 3/4" American black walnut, S4S.

White pine: For a grade comparable to the F.A.S. in hardwoods, the grade should be specified as "C" select genuine white pine. The grading of white pine is according to the Western Pine Manufacturers Association.

NOTE: Trees that shed their leaves in the winter, are classified as hardwood: such as oak, poplar, basswood, cherry, walnut, elm, hickory, birch, ash, maple, gum, and many others. Cone-bearing trees are classified as softwoods: such as pine, fir, larch, spruce, hemlock, and many others.

WHITE FIR

White fir, second only to Douglas fir of the Western pine region in production volume, is the fastest growing species in consumer acceptance of the entire group.

Averaging 108 million feet in production through the prewar years of 1937–41, output since 1945 has jumped to 605 million, nearly a 600 per cent gain. Production in 1949 was an estimated 650 million.

White fir, properly manufactured and seasoned, is a general utility lumber suitable for all purposes from the roughest of form lumber to the best in economical finish work.

White fir timber is found in mixed stands throughout the western pine region intermingled with one or more of the three western pines and other associated woods. Harvested with the other species, it is frequently available in mixed cars together with an assortment of many of them.

A brief run-down of the properties provides a clue to its value as a general purpose wood. It is nonresinous and, because of its thin-walled and fairly uniform-sized cells and its very narrow summerwood band, fine textured. Springwood is flat white in color and the summerwood has a slight reddish-brown tinge.

The wood weighs 27 pounds per cubic foot and has a specific gravity of .38 at 12 per cent moisture content. In strength, it ranks with the several important softwoods of similar weight and density in bending resistance, compression, and stiffness. Average volumetric shrinkage when dried from a green state to 12–15 per cent is 4.9 per cent.

It is easy to work with either hand or machine tools and machines to silky soft surfaces readily adaptable to paints, varnishes, or stains without special priming treatment.

It is odorless and tasteless after it has been dried. It may be treated with standard commercial preservatives. Its light, open-pored structure makes it one of the finest natural insulators in the softwood field.

In the residential building field, white fir is at its all-around best. Starting with concrete forms and ending with paneling and woodwork, it furnishes ample strength, good nailability, high dimensional stability and fine appearance for any purpose. It excels as studding, joists, plates, bridging, headers, and fire stops. For sheathing, subflooring, and roof decking, the wood gives exceptional service in use, superior insulation value and flat, true surfaces for application of siding, flooring, and shingles.

The light weight of white fir, its accurate milling, dimensional stability, and paint receptive surfaces make it a fine quality siding. It is available in a broad range of patterns and styles. Inside the house, white fir paneling, molding, and architectural woodwork is in high demand because of its light color and careful manufacture. It is particularly preferred for modern interiors where pastel finishes are used.

STORING DRAWING BOARDS

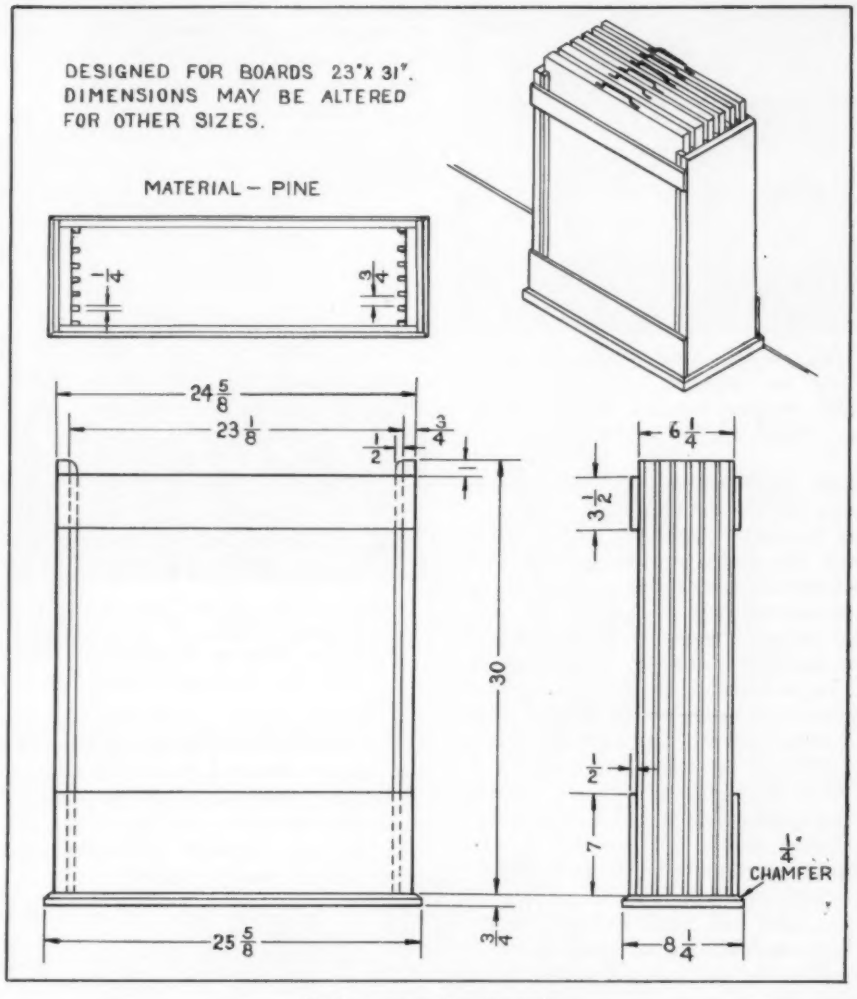
SAMUEL C. BEELER
Industrial Arts Director
Detroit University School
Grosse Pointe Woods, Mich.

In drawing rooms that lack storage space one is continually confronted with the problem, *where to store the large drawing boards.*

The common size may be stored in the space provided in the drawing tables; but the large boards, so necessary for architectural, perspective, and special drawing, create a real problem in most drawing rooms.

The problem may be solved by building floor racks, which are easily moved from place to place, which will fit flat against the wall, or which will fit spaces not utilized by other furniture.

Such racks, designed to meet these needs, have been used satisfactorily for sometime now. Advanced students keep their drawings on the boards, thus eliminating the time usually wasted setting up work each period.



Storing drawing boards

The size of the rack may vary to store any number of boards, each being numbered on the edge for identification. A handle is placed in the center of this same edge to aid in the removing and replacing of the boards.

Any number of these racks can be made and placed about the room in convenient places and yet occupy very little space.

HOMES BUILT BY VOCATIONAL STUDENTS

GEORGE H. KLAY
Drafting Instructor
Weymouth Vocational School
East Weymouth, Mass.

The Weymouth Vocational School, with its school buildings situated in East Weymouth, Mass., has developed a highly practical and amazingly useful method of integrating theory and practice in their carpentry department.

The able supervision of Francis E. Whipple, director of the department, and the technical guidance of carpentry instructors, Philip Henley and Fred Carlson, work in efficient co-ordination with the vocational students, to build, once a year, one home for a Weymouth town citizen!

Any citizen in the town of Weymouth, who in addition to other requirements, is a veteran of World War II, may make an application to have the Vocational

This photo shows the students working on the 1947–48 school project

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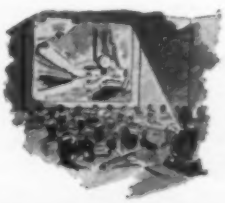

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PERSONAL NEWS

(Continued from page 298)

♦ JAMES C. EADIE, driver education instructor, Walden High School, Walden, N. Y., EDWIN WIEST, driver education instructor, Newton High School, Newtonville, Mass., and BERT L. WOODCOCK, assistant professor of safety education at Iowa State Teachers College, Cedar Falls, Iowa, have participated in the summer program in addition to the regular accident prevention department teaching staff headed by Marland K. Strasser and S. Kirklen Collins of the Association of Casualty & Surety Companies, 60 John St., New York 7, N. Y.

The driver education institutes were conducted from late May through August at colleges in the following states: Arkansas, California, Colorado, Georgia, Indiana, Louisiana, Minnesota, Nebraska, North Carolina, Oklahoma, Texas, Utah, West Virginia, and Wisconsin.

♦ DR. WILLIAM E. WARNER, professor of education, Ohio State University, Columbus, Ohio, will be on leave during the autumn, winter, and spring quarters, to organize the Ohio Civil Defense Program, as its executive director.

♦ ELROY W. BOLLINGER of New York City; HAROLD G. PALMER of Cedar Falls, Iowa; KENNETH PHILLIPS of San Diego, Calif.; and BERNARD S. PROCTOR of Hampton Institute, Va., are scheduled to receive their doctoral degrees at the convocation at Ohio State University on December 1, 1950.

♦ D. P. BARNARD, instructor of Audio-Visual Education and Photography at The Stout Institute, Menomonie, Wis., was awarded one of the four Encyclopaedia Britannica Films scholarships for the 1950 summer session at Indiana University.

He attended this summer session in order to take advanced graduate courses in Selection, Administration, and Production of Audio-Visual Materials.

♦ RAYMOND SCOTT, assistant professor of engineering drawing at the University of Michigan, Ann Arbor, Mich., was the visiting professor of industrial arts for the 1950 summer session at Central Michigan College of Education, Mount Pleasant, Mich.

♦ WILLIAM E. THOMPSON, 25, associate research mechanical engineer at the Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., has been appointed instructor in mechanical engineering at Illinois Institute of Technology.

He is a native of Pittsburgh, Pa., and attended Perry high school there. He received his bachelor's degree in mechanical engineering in 1947 at Carnegie Institute of Technology.

His master's degree was obtained in 1949 at the University of Michigan.

♦ HARRISON D. GOODMAN has been named instructor of mechanical engineering at Illinois Institute of Technology.

He is a native of Dallas, Tex., and was graduated from high school in Long Beach, N. Y. He received his bachelor of art's degree at the University of Wisconsin in 1944, a bachelor of science degree in mechanical engineering in 1948, and his master's degree in mechanical engineering in June, 1950.

During the war he served in the U. S. Navy.

♦ LEE HARNIE JOHNSON has been appointed dean of the faculty, College of Engineering, Tulane University, New Orleans, La.

♦ J. C. WOODIN, director of industrial and adult education, Wichita, Kans., was presented with a life membership in the American Vocational Association at a banquet held in his honor on April 28 by the 37 instructors and supervisors in the Wichita industrial education department.

C. M. Miller delivered an address — "What We Think of Jim Woodin."

♦ H. W. WICHERS, formerly instructor of photography at Kansas State Teachers College, has been appointed instructor in the department of natural sciences at San Jose State College, San Jose, Calif.

♦ EDGAR C. BROWNELL, special assistant for planning in the Veterans Administration office of Vocational Rehabilitation and Education, has been appointed manager of the V-A Center in Albany, N. Y. The Center consists of a 50-bed hospital at Saratoga Springs and regional office in Albany.

♦ DR. GERALD BERMAN, 25, of Toronto, Canada, has been appointed instructor of mathematics at Illinois Institute of Technology.

He received his bachelor of art's degree at the University of Toronto in 1947, and his master's degree and doctor's degree there in 1948 and 1950. He attended Harbord secondary school in Toronto.

He was awarded the Gordon Galloway medal in mathematics in 1943, and the government of Ontario scholarships for general proficiency 1943–47. While studying for his doctor's degree he compiled the tables used by the city of Toronto to re-assess the city.

♦ STERLING D. HUGGENS has been appointed teacher of industrial arts at the High School, Pitman, N. J.

He is a graduate of the industrial-arts education department of State Teachers College, California, Pa.

♦ G. H. OHEIM, a teacher in the Springfield, Mo., schools for the past 25 years, and presently employed to teach metalwork at Senior High School, was named by the board of education to succeed the late Albert Cardot as supervisor of industrial arts.

In addition to his work at Senior High School,

(Continued on page 22A)

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PERSONAL NEWS

(Continued from page 20A)

Mr. Oheim has taught at Southwest Missouri State College and at the Missouri University summer school.

♦ ROBERT QUAST won first prize in the Second Annual Texas Ceramics and Textiles Exhibition. He is a native of Yoakum, Tex. His prize of fifty dollars was for one of seven pieces of high-fired ceramic pottery. He competed with professional artists, craftsmen, and high school and college teachers.

Mr. Quast will open a modern program of industrial arts in one of the high schools in South Texas.

♦ JAMES J. BROPHY, JR., graduate assistant in physics at Illinois Institute of Technology, has been appointed instructor in physics at the Institute.

A native of Chicago, Brophy was graduated from Steinmetz high school in 1944. He received his bachelor of science degree in electrical engineering at Illinois in 1947, and his master's degree in physics there in 1949.

He is a member of the American Physical Society, and the American Society of Physics Teachers.

♦ PROFESSOR LESLIE HAWKINS, Panhandle A. & M. College, Goodwell, Okla., will take a leave for the next two years to work on his doctor's degree.

♦ CHARLES WINTERS is teaching at Monahan, Tex.

♦ CHESTER B. INGRAM is teaching general metalwork at Harding Junior High School in Oklahoma City, Okla.

♦ JAMES MCGUCKIN is teaching vocational carpentry in Oklahoma City, Okla.

♦ CECIL ACUFF is teaching at Sallisaw, Okla.

♦ H. L. HELTON, Oklahoma A. & M. College, is teaching woodwork at Central State College during the absence of Asbury Smith.

♦ WARREN CARMICHAEL is teaching in Chandler, Okla.

♦ PHILIP DISINGER has accepted a position at Kansas State Teachers College, Pittsburg, Kans.

♦ DOYLE RICH is teaching at Westville, Kans.

♦ MAURICE H. PANCOST, principal of the Technical High School, Lansing, Mich., has been made director of vocational education of that city.

♦ PROFESSOR ASBURY SMITH, head of the department of industrial arts, Central State College, Edmond, Okla., is now on leave of absence, working toward his doctor's degree at Wayne University.

SAM WEBSTER is acting chairman during his absence.

♦ HANS SCHLEGER, 51, internationally known artist and designer, has been named visiting associate professor in the Institute of Design of Illinois Institute of Technology.

Mr. Schleger came to the United States in 1924 and worked as art director for an advertising agency and as a free-lance artist.

For the past 16 years he has lived in London, where he worked during the war as consultant and designer to various branches of the British government.

He was named visiting associate professor under the U. S. information and educational exchange act of 1948.

♦ DR. DAVID H. MORGAN has been appointed dean of the faculty at Colorado A. & M. College.

♦ SAMUEL E. HARRIS has been appointed machine-shop instructor at Sumner High School, Kansas City, Kans.

The accident death toll in the U. S. last year was 98,000 lives, a 2 per cent decrease from 1947. Home deaths again led the list of causes, the only classification to show an increase during the year. — *National Safety Council.*

One out of every 16 persons in the United States suffered a disabling injury due to an accident in 1949. — *Safety News.*

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Give your metalcraft work a perfect start — by using high quality METAL GOODS handicraft metals. They're easy to work — and assure lasting satisfaction in your handicraft.

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5239 Brown Ave., St. Louis 15, Mo.

Questions and Answers

ARTICLES ON COURSES OF STUDY

1143. *Q.:* Could you furnish me with a list of articles pertaining to courses of study for general farm shop equipment? — *H. G.*

A.: If you will check through the following list of materials published in past issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, you will find information on courses of study for general farm shop:

1931 — I.A.V.E.
June, p. 208, "Fitting the General Shop to the Small Budget"
July, p. 244, "Teaching Aids for the General Shop"
1933 — I.A.V.E.
February, p. 104, "Developing a General Shop Course"
March, p. 71, "Economical General Shop Course"
1935 — I.A.V.E.
February, p. 54, "General Shop for Rural Schools"
1943 — I.A.V.E.
March, p. 128, "Course of Study for Farm Shop"
June, p. 258, "Teaching Aids in the General Shop"
September, p. 283, "Outline of General Shop Course"
1944 — I.A.V.E.
February, p. 73, "Homemade Equipment for Processing and Storage of Food"
March, p. 88, "Industrial Arts in a Small High School"
October, p. 307, "Building a General Shop Curriculum"

— *J. J. M.*

News Notes

♦ Douglas Fir Plywood Association, Tacoma Bldg., Tacoma 2, Wash., has just issued its 1950 basic catalog for Douglas fir plywood which gives the various plywood grades, uses in construction, as well as plywood property information and plywood construction high lights.

Also obtainable is a reprint from the American Builder, which presents an excellent picture of plywood in light construction.

♦ The National Education Association, 1201 Sixteenth St., N.W., Washington 6, D. C., has published a report of the conference on High-School Driver Education: Policies and Recommendations. This is available at 50 cents a copy.

♦ *You and Your Mental Abilities,* a new 35mm. film strip for high school guidance work and teacher training, has just been released by Science Research Associates, Chicago, Ill. It presents pictorially the Thurstone primary mental abilities theory of intelligence. It was developed during 15 years of research by Louis L. Thurstone, professor of psychology at the University of Chicago, with his wife, Thelma Gwinn Thurstone, director, Division of Child Study, Chicago Public Schools.

This new film strip carries 51 frames of pictorial information, with captions, followed by a 5-frame quiz.

For further information write to Science Research Associates, 228 S. Wabash Ave., Chicago 4, Ill.

♦ A new safety training film which should convince the most skeptical workman that it's smart to wear safety glasses has just been announced by the National Safety Council.

(Continued on next page)

Kester Solder

COMMERCIAL SOLDERING OF INDUSTRIAL WIRE SCREEN

Using Kester Flux-Core Solders in your classroom will better equip students for their future work. Kester solders are accepted, without question, as the leader in the industrial field.

Easier to Use

Kester Flux-Core Solders are easier to use and will enable students to work at top speed with the best finished results. Waste is eliminated which is important in classroom work.

Top Quality

Kester Solders are made only from newly mined grade A tin and virgin lead. Fluxes—chemically and scientifically correct.

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FREE: Send for Kester's New 16-page booklet "Soldering Simplified"

KESTER SOLDER

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COMPLETE OR PARTIAL INSTALLATION
BACKED BY YEARS OF "KNOW-HOW"

Whether your requirement is a few additional pieces of furniture or fully equipped new departments . . . laboratories, homemaking, art, vocational or industrial shops . . . Sheldon provides standard and modified units that are outstanding for excellence of design and construction . . . qualities that long and hard usage only serve to emphasize. In experience and facilities, Sheldon is unsurpassed; and Sheldon's record of customer satisfaction is unique.

Look TO SHELDON
For LEADERSHIP!

IT'S THE DETAILS THAT MAKE THE DIFFERENCE

Whether of wood or metal, Sheldon furniture is soundly engineered and carefully constructed. Drawers and doors continue to function properly despite hard usage. Drawers are equipped to receive partitions that are easily arranged and rearranged to accommodate contents for orderly storage and to prevent breakage . . . Just one more example of Sheldon's thoroughness in detail.

The key to your complete equipment problem

E. H. Sheldon & COMPANY
MUSKEGON, MICHIGAN

NEWS NOTES

(Continued from preceding page)

Titled "Easy on the Eyes," the film opens on an emotional appeal for workers to realize what their eyes mean to them, then shows how easily eyesight may be lost and that such loss is personal.

This film is available from the National Safety Council in the usual 35mm. sound slide film, but it also is offered in a new form for 16mm. sound-motion projectors.

Prices for outright purchase, preview, or rental may be obtained on request to the National Safety Council, 20 North Wacker Drive, Chicago, Ill.

♦ Judge Frank M. Padden in Superior court, on June 12, 1950, signed an order authorizing closing of the Pullman Free School of Manual Training, 250 E. 111th St., Chicago, Ill.

It was founded and endowed with $1,200,000 under the will of George M. Pullman. The school, operated for 35 years, was to be closed June 16 and the endowment used to establish the George M. Pullman Educational Foundation. Board members decided to close the school because of continued deficits.

♦ Approximately 40 students from the machine woodworking, advanced cabinetmaking, and wood-finishing classes under the supervision of Professor Forest Penny and Leo Ensman, Kansas State Teachers College, Pittsburgh, Kans., visited furniture manufacturing plants in Springfield, Mo., on March 28. The purpose of the trip was to give the students some firsthand insight into the methods used in the field of business.

♦ A revised circular on Interior Design, Circular Series H1.0, can now be secured from the Small Homes Council, University of Illinois, Urbana, Ill., at 10 cents a copy.

♦ Layers of a new insulating and splicing tape based on Bakelite polyethylene resins weld into a continuous elastic skin within a few minutes after wrapping around a cable splice or tool handle. Wrapped around a ping-pong paddle handle and cut a few minutes later, the tape is removed in one solid homogeneous mass. The plastic base keeps the self-bonding tape flexible despite severe weather conditions. The tape is unaffected by temperatures ranging from —30 to 120 deg. F. The seal made with this tape requiring no adhesive material, is a positive, permanent, moisture and airtight seal. It is unaffected by corrosive fumes, ozone, sunlight, and oxygen. For application, the tape is stretched to two or three times normal length, then wrapped normally. It is almost impossible to unwrap or delaminate. Both clear and black forms of the tape are produced by Bishop Mfg. Corp., 254 West 31 St., New York 1, N. Y.

♦ The Cornell University Press announces the publication of a labor-management relations study, "Employers' Associations and Collective Bargaining in New York City" by Associate Professor Jesse T. Carpenter, New York State School of Industrial and Labor Relations.

The book is the second in a new series of industrial and labor relations topics as the result of research efforts by the New York State School of Industrial and Labor Relations.

Copies of Professor Carpenter's 437-page book may be purchased for $4.50 from the Cornell University Press, Ithaca, N. Y.

♦ A total of 787 industrial workers — 783 women and 4 men who saved their sight by remembering to wear safety glasses — have qualified for membership in the Wise Owl Club of America. This organization was organized about 2 years ago.

The Wise Owl Club is one phase of the sight conservation program in industry sponsored by the National Society for the Prevention of Blindness.

The 787 workers who are now members of the Wise Owl Club are from 152 different industrial plants located in 33 states and Canada.

The address of the National Society for the Prevention of Blindness is 1790 Broadway, New York 19, N. Y.

♦ The new book *Radio Operator's License Q&A Manual* by Milton Kaufman, is currently at all Rider distributors.

The new book systematically lists the questions and answers to past FCC exams, plus a *follow through* discussion to the answer, so necessary for complete understanding of the technical question. It is based upon the latest Government Study Guide and supplementary FCC releases. A valuable "extra" are the useful appendices (Small Vessel Direction Finders and Automatic Alarm), never before available in a book of this type.

Radio Operator's License Q&A Manual contains 608 pages in a cloth binding (5⅝ by 8½), and sells for $6. It is published by John F. Rider Publisher, Inc., 480 Canal Street, New York 13, N. Y.

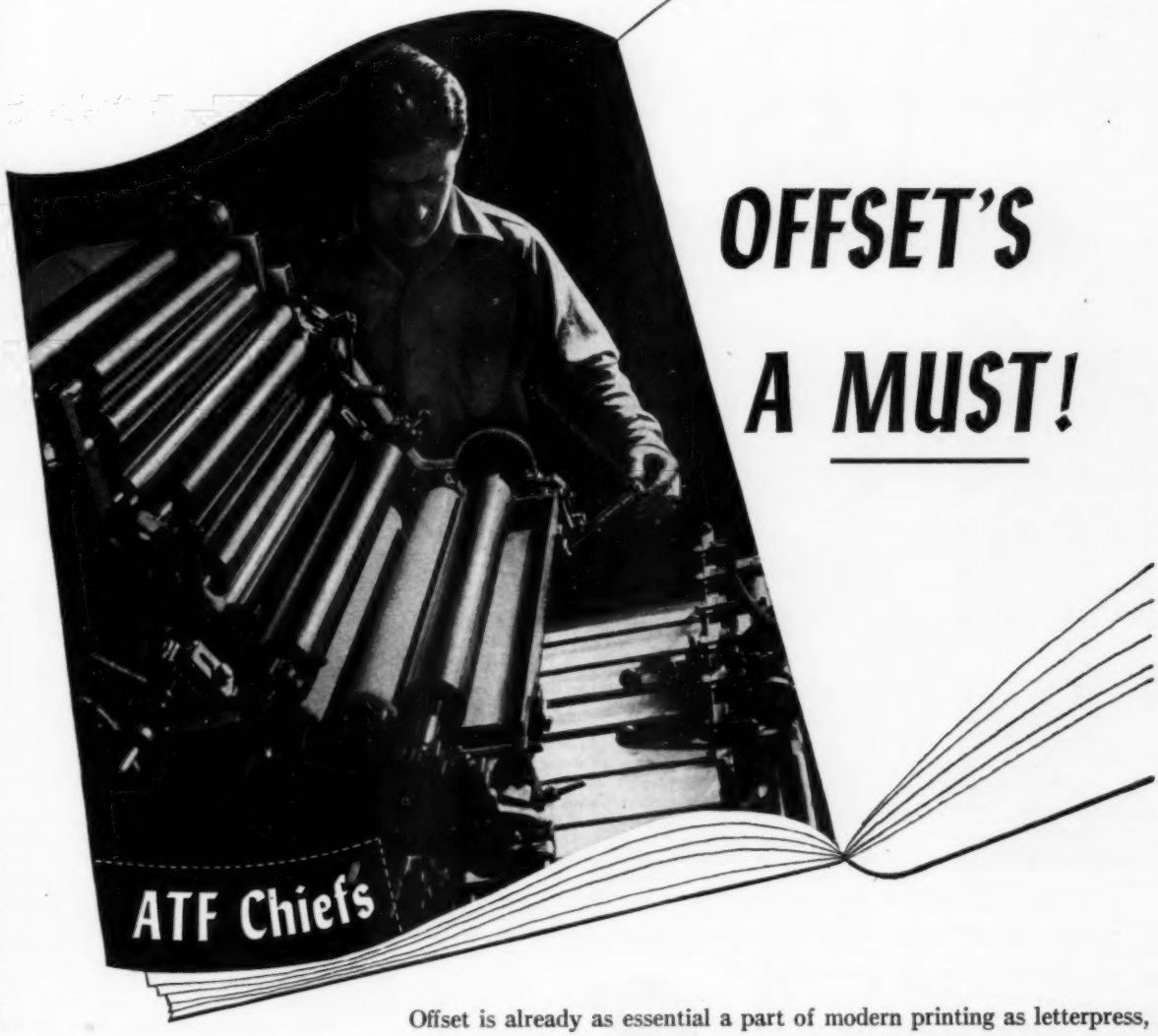
♦ Children's Day will be observed again this year on the third Sunday of October — October 15. The 1950 poster, a painting by Mary Horton, has just been unveiled. The poster will be reproduced in full color as window blow-ups, counter cards, and window streamers.

A folder describing the various Children's Day sales helps is available from the Children's Day National Council, 52 Vanderbilt Ave., New York 17, N. Y.

♦ A 12-page illustrated booklet on "Amberlite Monobed Deionization" offers a miniature textbook in readable form on the history, behavior, present performance, and potential uses of the Monobed ion exchange systems in the water-conditioning, chemical process, and other industries.

Reactions of the various combinations of exchangers are explained in text and equations. The booklet also discusses operating costs, equipment costs, quality of product derived, rinse

(Continued on page 26A)

In TODAY'S *Graphic Arts Instruction*

OFFSET'S A MUST!

Offset is already as essential a part of modern printing as letterpress, and is growing rapidly in importance. Practically any shop the student eventually enters will have an offset department, usually equipped with one or more ATF Chief offset presses. For the same reasons that printers choose ATF Chiefs for high quality, fast and profitable production, these presses offer numerous advantages for student instruction. Their design and construction are easy to understand, their complete facilities and simple adjustments for the finest offset work are readily mastered by the students. What they learn on a Chief will give them complete command of any other sheet-fed offset press.

Write for detailed information on the ATF Chiefs and other ATF equipment for graphic arts instruction, as well as for complete cooperation in laying out and planning the department.

Other ATF Equipment Available for School Shops

ATF Kelly Presses
ATF Little Giant Automatic Jobber
ATF Process Cameras
Offset Platemaking Equipment
Lens-O-Matic Diaphragm Control
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The greatest variety of foundry type in the world and every item needed for composition, presswork and bindery

American Type Founders

Department of Education 200 Elmora Avenue, Elizabeth B, New Jersey

PERFECT FOR SCHOOL SHOPS...

THE AMMCO 7" SHAPER

Straight cut on a flat piece of work

Angular cut on the edge of a piece of work

Set-up for cutting internal key ways

MAXIMUM STROKE, 7¾". Strokes per minute 40, 70, 115, 180.
TOOL HEAD adjustable and graduated from 0° to 90° for angle work.
FEED MECHANISM of reversible, adjustable type. Feed varying from .003" to .018" obtainable.
SAFETY BELT GUARD hinged for quick speed changes.

You can't find a better shaper for shop training use than the versatile, accurate AMMCO. It's a rugged professional model in an ideal size for training applications. Not a "light weight" shaper, but sturdy enough to be employed at the heaviest industrial operations within its range, it will give years and years of school shop service.

You'll find it perfect for instruction purposes due to its simplicity of operation and ease of set-up, as well as its fine precision results. A student who has become proficient with an AMMCO Shaper is capable of handling the most exacting professional jobs.

Get complete details on this "precision machine of a thousand uses". Available in bench or portable cabinet models. Your budget will appreciate the money you save on the purchase of AMMCO shapers. Write for free catalog No. IA-548.

AMMCO

AMMCO TOOLS, INC.

2100 Commonwealth Ave., North Chicago, Illinois

NEWS NOTES

(Continued from page 24A)

requirements, and other properties as they apply to the complete or partial single-step removal of ionized solids from solution. A final table shows helpfully the nomenclature, chemical behavior, and typical uses of each of the six systems thus far developed and evaluated. The booklet is available on request to the Resinous Products Division, *Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.*

♦ Despite pessimistic pregraduation forecasts, more than 75 per cent of the 471 June engineering graduates at Illinois Institute of Technology have already found employment.

Harold L. Minkler, Institute placement director, expressed the opinion that if job opportunities continue to come in for the next six weeks as they have for the past six, the entire class will be employed by August 31.

Highest average starting wages of $273 are being paid to civil engineering graduates. Average starting wage of all graduates is $259, a slight increase over the $257.50 average a year ago, and more than double the 1940 starting figure of $119.

♦ To aid industrial safety directors in choosing the proper safety glasses for 69 specific jobs, Bausch & Lomb has produced a compact, easy-to-use Safety Eyewear Selector.

Job classification numbers refer users to a sliding selection table that lists such occupations as acetylene welders, drillers, platers, riveters, and the like. The various safety frames applicable for each task are numbered and illustrated for identification.

The selectors may be obtained from Bausch & Lomb area representatives in the United States and Canada, or from Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.

♦ A new film produced for International Acetylene Association by Transfilm Incorporated has just been completed. It is titled "The Oxy-Acetylene Flame — Master of Metals," and shows the complete oxyacetylene process.

The film has sound educational value and will be made available, free of charge, to the public through the members of International Acetylene Association, those who produce the gases, the cutting equipment, and the supplies used in the oxyacetylene processes.

Requests to borrow the film should be made to the Supervising Engineer, Graphic Services Section, Bureau of Mines Experiment Station, 4800 Forbes St., Pittsburgh 13, Pa.

♦ A new 8-page illustrated "Strip-Line" Data Bulletin, issued by Benjamin Electric Mfg. Co., Des Plaines, Ill., gives complete information on a new, compact, extra-shallow fluorescent lighting system for slimline and 40w bipin lamps, called "Strip-Line." Typical uses are for "Sky-Glo" Louverall Ceilings, charts, glass blocks, and show windows.

♦ Why not get a copy of "Why Do Boys and Girls Drop Out of School and What Can We Do About It" (Circular No. 269)? It may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 35 cents.

Earl James McGrath, U. S. Commissioner of Education, reports that there are an estimated 1,741,000 youths between 12 and 17 who are not in school.

♦ A new rubber sample kit containing materials for 11 classroom experiments has been prepared by United States Rubber Company. It gives up-to-date information on natural and synthetic rubber and is designed for use in the upper grades of grammar school, junior high school, and senior high school classes.

The kit may be obtained at cost by writing for "Rubber Sample Kit" and enclosing 30 cents in coins. The address is: United States Rubber Co., Public Relations Dept., 1230 Avenue of the Americas, New York 20, N. Y.

Please send coins, not stamps.

♦ Under the guidance of their instructor, C. E. Evans, the students of woodworking at the High School, Lincoln, Neb., have erected a 36 by 220-ft. horse barn with 40 stalls at the state fair grounds of their community.

♦ 310 years ago in a Massachusetts town, a youngster named Thomas Millard signed an indenture binding himself as an apprentice to a master to serve him diligently and cheerfully for eight years. In return for his services his master promised to give him "meat, drink, & clothing fitting such an apprentice & at the end of his tyme one new sute of apparell & forty shillings in mony." If Thomas would come back today he would be surprised at what a difference a few centuries make in the treatment and lives of the nearly 237,000 apprentices now in training in the United States.

With 150,000 employers now taking part in the training of apprentices, an increasing number of inquiries regarding the history and development of apprenticeship are being received by the Bureau of Apprenticeship, U. S. Department of Labor, from schools and universities, students and apprentices, as well as from the general public.

The Bureau of Apprenticeship has compiled a comprehensive, illustrated booklet, entitled "Apprenticeship — Past and Present," which may be obtained for 15 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

♦ The eleventh edition of the General Motors Film Catalog has now been published. All of the 41 films in the 1950–51 GM Film Catalog are 16mm. sound, suitable for use at schools,

(Continued on page 29A)

Weston

ELECTRICAL INSTRUMENTS MEET EVERY INSTRUCTION NEED

Your own introduction to elementary electricity may have been made with a Weston Model 375 Medium Sensitivity D-C Galvanometer. Rugged, inexpensive, excellent for student use.

For general testing and laboratory work, Weston Model 528 Miniature Portable A-C Instruments combine dependability with relatively sensitive operation. Model 489 Companion D-C Instruments also available.

Resistance measurements and circuit continuity checks are simple with the Weston Model 689 Pocket-Size Ohmmeter. A self contained 1½ volt battery provides energy for operation.

An instrument of broad versatility is the Weston Model 697 Volt-Ohm-Milliammeter. Checks up to 750 volts A-C and D-C; 75 milliamperes D-C; 500,000 ohms. Small, compact; ideal for portable use.

For full information on specific Weston instruments to meet your particular requirements, write

WESTON ELECTRICAL INSTRUMENT CORPORATION

Manufacturers of Weston and Tagliabue Instruments

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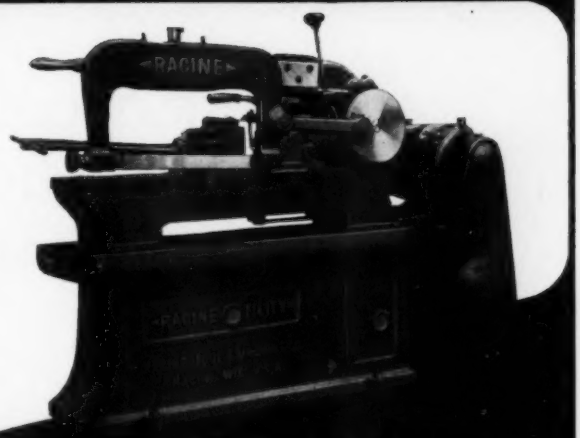
IF YOU DO METAL SAWING IN YOUR SHOP...



a RACINE "Utility" METAL SAW

. . . WILL
. . . SAVE TIME AND METAL
. . . DO THE JOB FASTER
. . . DO IT MORE ACCURATELY

One of the handiest machines in any institution or school shop. The "Utility" model is the metal saw so popular in large and small industrial shops used to augment high production, automatic metal saws. It is the perfect saw for general purpose, all around metal cutting work up to 6" x 6" capacity.

Compact — hydraulically operated — fully guarded, a 15-year-old can learn to operate the "Utility" model in 30 minutes. Available in either Wet Cut or Dry Cut styles.

Other RACINE metal saws are available up to 20" x 20" capacity. Write us about your metal cutting work. Address Racine Tool and Machine Co., 1780 State St., Racine, Wisc.

Investigate our Oil Hydraulic Pump and Valve line. Ask for Catalog P-10-D.

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Standard for Quality and Precision

From
MACMILLAN
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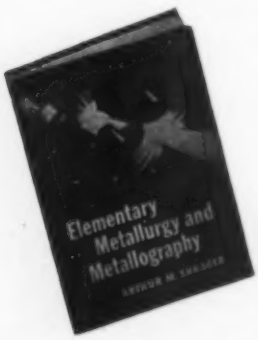
Two outstanding texts for vocational courses

MOTOR TUNE-UP MANUAL

By Ralph J. Everest

Exceptionally full, clear explanations of auto electricity and of engine and combustion principles give the student the knowledge he needs in order to make the right analysis of engine trouble as well as to make corrective adjustments accurately and skillfully. All engine parts are clearly explained. Detailed instructions are given for every step in both minor and major tune-up jobs. "A very fine text," says the Dir. of Vocational Education in Lockport, N. Y. "Very clearly written and well illustrated." $5.50



ELEMENTARY METALLURGY AND METALLOGRAPHY

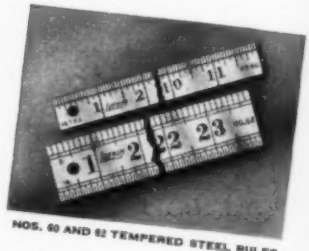
By Arthur M. Shrager

The first text on this important basic science for vocational school students, already being highly recommended by the metals trade because "it affords ample opportunity to gain a useful working knowledge and understanding of the subject . . . clear, concise, and easy to follow." (Stuart Kingsley, in *Journal of the Franklin Institute*). This book now supplies the teaching materials you need for the related science course on metals for students of foundry, welding, and the other metal-working subjects." $4.75

Write to our Educational Department for sample copies to consider for your courses next term.

BETTER MEASURE WITH LUFKIN

It's Easier to Teach ACCURACY With LUFKIN'S Larger Figures— Heavier Lines!



NOS. 60 AND 62 TEMPERED STEEL RULES

Having larger figures and heavier lines than ordinary machine divided scales, the *Lufkin* No. 62 one-piece rule is a "teacher's favorite" . . . enables students to see right—be right. All markings, on both sides are protectively sunken—in easy-to-read black—and permanent! Upper edge marked in 8ths, lower in 16ths—opposite sides measure from reverse ends. Hole in end for hanging. No. 60 rule is similar but marked on upper edge, one side 8ths, the other 16ths. Write today, for free catalog illustrating the complete line of *Lufkin* Precision Tools.

Buy **LUFKIN** TAPES • RULES PRECISION TOOLS

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SJÖSTRÖM SHOP BENCHES

Act *now.* Orders for Sjöström Shop Benches will be filled immediately. Thousands of these famous benches are in use in schools, colleges and industrial concerns throughout the country. Their success, measured in terms of demand, has been so tremendous that they are now manufactured and stocked in large quantities to fill all orders, large or small, *immediately.*

JOHN E. SJÖSTRÖM COMPANY

1712 N. Tenth Street, Philadelphia 22, Penna.

NEWS NOTES

(Continued from page 26A)

churches, club, and business organization meetings.

Nine of the films listed this year are in full color. New subjects are being listed for the first time.

As in the past, all of the films are non-advertising in character and are available to users at no cost except for transportation.

Copies of the GM Film Catalog may be obtained by interested groups from the *General Motors Public Relations Department, General Motors Building, Detroit 2, Mich.*

♦ The American Automobile Association, Pennsylvania Ave. at 17th St. N.W., Washington 6, D. C., has published a Project Workbook for "Sportsmanlike Driving," at 92 cents per copy.

This Project Workbook, prepared by Mrs. Helen Knandel, follows the continuity of "Sportsmanlike Driving." It utilizes outstanding projects in the text and its Teacher's Manual. and provides constructive assignment work — especially useful for students while the teacher is engaged in supervising driving practice.

♦ Ditto, Inc., manufacturers of duplicating machines and supplies, announce the addition to their line of 49 workbooks printed through carbon paper for reproduction on Direct Process (liquid) machines. These new books cover word study, phonics, language, arithmetic, science, nature study, health and safety, geography, and art.

These books will reproduce up to 200 copies from one original on any Direct Process (liquid) duplicator.

To increase cleanliness and length of the life of the book, carbon has been removed and the pages have been bound so that there is little or no rubbing. Each page is also slipsheeted to prevent offsetting to the page next to it. Masters will last indefinitely and may be used repetitively — 40 copies today, 40 copies six months from now, and so on.

For catalog, write to Ditto, Inc., 2243 West Harrison St., Chicago 12, Ill.

♦ The Teaching Aids Laboratory of the Ohio State University is planning to produce a series of film strips with accompanying bulletins dealing with various aspects of in-service teacher education. The first of these film strips under the title, "How to Keep Your Bulletin Board Alive," has just been released. It consists of 32 full-color frames and an accompanying live-page bulletin.

♦ The International Radio Tube Encyclopedia, edited by Bernard B. Babani, makes an outstanding contribution to the literature on electronic engineering. It is available at British Industries Corp., 164 Duane St., New York, exclusive American agents. Price, $6.50.

♦ A new, concise 32-page *Planning Guide to Improved Plant Lighting*, covering the latest concepts of Planned Lighting for industry, the benefits to be gained and the methods to employ to put a Planned Lighting Program into effect, is published by Benjamin Electric Mfg. Co., Des Plaines, Ill. Subject is covered from management viewpoint, broken down into: Economics, Program Development, and Equipment Selection.

♦ June 22, 1950 was the sixth birthday of the G.I. Bill, a law passed June 22, 1944, to help World War II veterans get back into the swing of civilian living.

During the six years the act has been in effect, some 7,000,000 ex-servicemen and women, at some time or another, have attended school or trained on-the-job or on-the-farm under the law's educational provisions. This program so far has cost more than 10 billion dollars for tuition, supplies, and subsistence allowances.

All together, the veterans spent a total of 95,000,000 months in the classroom, at the workbench, and on the farm, or an average of about 15 months of training per veteran.

BAND SAW

2 to 4 Times *FASTER!*

BOICE-CRANE 14-inch BAND SAW

Operates at higher speed — 4,400 blade feet per minute. Smoother, more accurate cutting.
Single and 8-speed back-geared models for cutting practically any material. Clears 8⅝" under the guide.
One-piece welded steel frame has tremendous strength. Wheels and blade, except at cutting point, entirely enclosed. Cabinet type base has sealed-off motor compartment. High safety rating.
Blade guides adjust by a single control, and with full safety, even when the machine is running.
Close balance and light, but strong, molded Textolite wheels permit twice the speed of other 14-inch machines. Less vibration. Longer bearing life. Often pays for itself in three to six months.

Sawing capacity: Blade to guard — 13½", 27" diameter work. Guide to work table — 8⅝". Table: Tilts on double trunnions. Size 15" x 15½". Height overall of floor model — 67". Blade widths: 3/16", ¼", ⅜", ½" and ¾". Length of blade: 98". Wheels: 14" dia. — 1" face. Grease sealed ball bearings. Blade speed at 1200 r.p.m.: 4,400 ft. per minute.

ANOTHER BOICE-CRANE "FIRST"

Complete line of individual cutters and sets for cabinet work, mill work, window and storm sash and doors.
The first cutters at moderate prices with CIRCULAR or INVOLUTE RELIEF (also called flattened-arc relief: cam-profiled relief). The "Tru-Form" principle involves design and new machining methods that:

1. Assure cleaner, more burn-free cutting.
2. Cut the true, original shape and dimensions as long as the cutter lasts.
3. Provide a larger rake angle. Never a laggy, scraping cut, always easy and clean cuts that shear or shave the work without vibration.
4. Deliver up to 50% more usable cutter life.
5. Provide improved clearance so necessary for successful high speed shaping.
6. Reduce cutting edge crumbling or breaking down — common with straight relief cutters. "Tru-Form" tooth shape reinforces cutting edge and dissipates more heat.

Fine tungsten tool steel. Deep uniform hardening. Precision formed. Razor sharp. Designed for Boice-Crane Shapers but improve performance of all other makes.

BOICE-CRANE INTERMEDIATE CAPACITY POWER TOOLS

- Designed for ready adaptability to a wide range of projects, fewer machines are needed to fill all your requirements.
- As nearly 100% safe as modern devices permit.
- Just the right size for school shops — not too big, nor too small. Permit more efficient shop layouts.
- Durably constructed, they can take a beating which would incapacitate most machines.

Sold through industrial supply distributors in most cities.

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Please send free literature on Boice-Crane
☐ Band-Saw ☐ Shaper Cutters
☐ New 44-page Catalog No. 50 on entire line
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♦ John W. Studebaker, chairman, School and College Conference, National Safety Council, has announced that the Council's services and materials are now available to institutions of higher learning.

A subcommittee of the Higher Education Committee working with the School and College Conference has developed a plan by which colleges and universities may gain the advantages of membership in the Council without becoming formally enrolled members.

Schools with curriculums in engineering, physical sciences, business personnel administration, or physics, have the choice of three types of services depending upon the budget available. The most complete service is priced at $16; the next at $12.50; and the minimum service at $7.

For full information about these services write to the Membership Department, *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.* Indicate for which curriculums you want safety information.

♦ This summer in Indianapolis two pottery workshops were made available to teachers and occupational therapists through the joint efforts and facilities of the John Herron Art School and the American Art Clay Company. Kenneth E. Smith, director of the Ceramic Department of the American Art Clay Company, co-operated with Donald M. Mattison of the John Herron Art School in planning the ceramic classes. College credit was given for the work.

Instructors were supplied from the American Art Clay Company personnel. Miss Elizabeth Harlan, who taught the basic course in ceramics, had her art training at Indiana University and

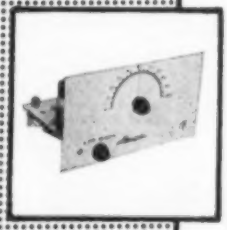
(Continued on next page)

IDEAL CLASSROOM PROJECTS!

NEW MEISSNER *Engineered**

RADIO KITS

*Painstaking design by skilled MEISSNER engineers has resulted in a line of advanced radio kits of unequalled instructional value. MEISSNER kits incorporate the latest circuits and most modern tubes — assuring highest efficiency and TOP PERFORMANCE! Not "sweep-ups" or factory surplus, each part in a MEISSNER kit is the EXACT AND BEST PART for the job. All MEISSNER kits come with detailed pictorial and schematic diagrams.



MEISSNER MODEL T2BK. 2-TUBE BATTERY TRAINER KIT

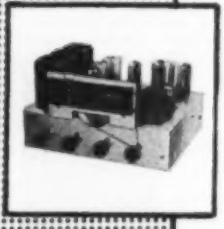
- High Performance
- Low Drain Battery Tubes
- Powerful Pentode Audio
- Regenerative Circuit
- Tubes & BC Coil Included
- Additional Coils Available

Model T2BK 2-Tube Battery Trainer Kit, Less Batteries, Headphones, Wire & Solder, Net.....$7.35

MEISSNER MODEL T3BK AC-DC TRAINER KIT

- "Beam-Power" Audio Stage
- Range — 175 Kc to 34 Mc
- 3 Tubes & BC Coil Included
- Additional Coils Available

Model T3BK AC-DC Trainer Kit, Less Headphones, Wire & Solder, Net $8.98



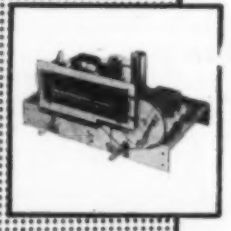
MEISSNER MODEL T6BK 3 BAND AC KIT

Practical, up-to-date instruction in the latest receiver technique. Detailed pictorial diagram and schematic easy to understand.

ALL STAR FEATURES!

- 6 Tubes included with kit
- "Beam-Power" Amplifier
- 535 Kc to 18 Mc in 3 overlapping bands
- Continuous Tone Control

Model T6BK 3 Band AC Kit, less speaker, wire & solder, Net Price...$32.85

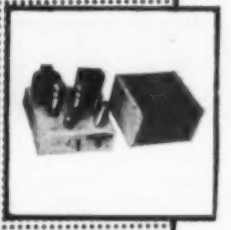


MEISSNER MODEL T8CK FM RECEPTOR KIT

Popular MEISSNER FM Receptor now in kit form. Converts AM receiver to static-free, high fidelity Frequency Modulation.

- Covers New FM Band 88 to 108 Mc
- Top Quality Components
- 8 Tubes (including Rectifier) Supplied
- Easily Assembled

Model T8CK FM Receptor Kit, less wire & Solder, Net Price.....$29.97



MEISSNER MODEL T4AK POWER AMPLIFIER KIT

A new, Husky, superb-fidelity amplifier.

- Flat Within 2 db from 45 to 20,000 Cycles
- Tubes: One 6SN7G9, Two 6L6G & One 5Y3GT
- 3 Volts RMS Input Required
- 20 Watts Output With 5% Harmonic Distortion
- All Parts Furnished Including Drilled-Punched Chassis

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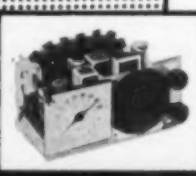
LONGTIME FAVORITES

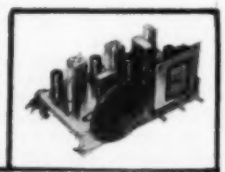
BROADCAST BAND SUPERHET KIT

Easily constructed AC-DC Broadcast Superhet, 5 tubes including rectifier. Unusual performance and appearance. Ideal for class-room project, parts will withstand repeated rebuilding. Model T10-1191-A Superhet Kit with speaker & tubes, less wire & solder, Net $16.30



BC & SW BANDS SUPERHET KIT

50 to 1600 kc & 6 to 18 mc. Six tubes including rectifier. MEISSNER engineering assures ease of construction and top performance. 5" speaker for extended audio response. High stability. Has that "factory appearance." Model T10-1199, 2 Band Superhet Kit with speaker & tubes, less wire & solder, Net $21.75



MEISSNER MFG. DIVISION Maguire Ind., Inc. Mt. Carmel, Illinois

WRITE TODAY FOR FREE MEISSNER RADIO KIT FOLDER

NEWS NOTES

(Continued from preceding page)

the University of Mexico. Instruction in throwing on the wheel and sculpture was given by Robert N. King, who studied ceramics under Karl Martz and sculpturing with Robert Laurent of Indiana University. Kenneth E. Smith, who co-ordinated the work as a whole, also lectured on the history of ceramics. Mr. Smith, a former Associate Professor of Ceramics at Newcomb College, holds a bachelor of science degree in ceramic engineering from Alfred University and a master of art's degree from Ohio State University.

♦ Earl E. McMunn, instructor in the Emporia, Kans., public schools, notes that he found the addition of a dual accelerator and starter both convenient for the instructor and an additional safeguard in some traffic instances in which the immediate application of power is essential.

♦ The San Francisco Public Schools' Adult Education Division has enrolled some 2700 adults in their adult driver education program since January, 1948. In this time 1671 adults have completed behind-the-wheel instruction.

New Publications

Modern Book Ends

By R. B. Newhauser. Cloth, 99 pp., 6⅛ by 9¼ in., illus., $2.25. The Bruce Publishing Co., 400 N. Broadway, Milwaukee, Wis.

This book contains working drawings, half-tone illustrations, and explicit directions for making 24 novel book ends that are decidedly different from those usually seen in schools, shops, and stores.

The various types shown will delight industrial-arts teachers, their students, hobbyists who delight in working with wood, and the homecraftsman.

The clear working drawings and the clear directions given with each of the book ends will be very helpful to all who attempt to make these useful and beautiful projects.

Leather Tooling and Carving

By Chris H. Groneman. Cloth, 111 pp., 8 by 10½ in., illus., $2.75. International Textbook Co., Scranton, Pa.

A well-illustrated book on this interesting subject of leatherworking.

The half tones made from photographs showing projects actually made, show the student and homecraftsman that with proper care, most excellent work may be produced.

The directions given are clear and to the point, and the selection of problems is very good.

You Can Make a Stradivarius Violin

By Joseph V. Reid. Cloth, 48 pp., and 8 plates, 6⅝ by 9½ in., $3.50. Popular Mechanics Press, Chicago 11, Ill.

This book tells why a Stradivarius Violin is worth as much as $80,000. It reveals the methods by which the old masters worked, and gives step-by-step instructions for making a violin of your own modeled after a famous "Strad."

The author has made hundreds of fine violins and studied the methods of Antonio Stradivari and other master violin makers of the sixteenth and seventeenth centuries. In this book he puts down in clear and simple language and shows how a violin can be made.

The big plans which accompany the book are held in a pocket attached to the front cover. It is easy to work directly from them.

NEW PUBLICATIONS

In the book are detailed instructions telling what wood to buy, how to fashion the belly, back, sides, mold, linings, neck, scroll, and purfling of the violin. There are separate chapters on the important subject of varnishings and stringing.

Treen

By Edward H. Pinto. Cloth, 120 pages of text and 63 pages of plates. B. T. Batsford Co., New York, N. Y.

Treen embraces every variety of small wood objects made for personal, household, or artistic use. The making of treen is essentially a European peasant art that goes back to earliest recorded history. The present book is largely limited to articles found in English museums and private hands and some of the things date from the earliest Saxon days to recent years. A more limited display of articles is taken from northern Europe, France, and Italy, and even America.

The text is intended to aid the collector in distinguishing genuine from fake articles, but the plates will be found most helpful to home craftsmen and students who are looking for ideas to make such things as kitchen and tableware, toys, vases, bowls, small farm tools, drinking vessels, and the like.

The Art of Bricklaying

By J. Edgar Ray. Cloth, 240 pp., 5⅞ by 8¼ in., illus., $4. Charles A. Bennett Co., Peoria, Ill.

The author of this book is specially qualified to write on this subject. He spent 42 years as a union bricklayer in seven states, and taught the subject at a teacher-training institution for years.

The book, therefore, can be highly recommended to trainers of apprentices, to teachers of industrial-arts shops where bricklaying is taught, and to the inquisitive hobbyist or the homecrafters who want to know something about this art.

It also is a good reference book for the practical journeyman interested in improving himself.

The book treats briefly and interestingly of the history of brickmaking, composition of brick, lime, and mortars; the tools used by the bricklayer, corners and bonds, patterns in brickwork; details and construction; building chimneys, arches, and ornamental brickwork; laying cement blocks; and setting up scaffolds.

It also contains a glossary of trade terms.

Man Around the House

By Norbert Engels. Cloth, 195 pp., 6¾ by 10 in., illus., $2.95. Prentice-Hall Inc., New York, N. Y.

This book will be welcomed by those who love to tackle furniture repair jobs in the home, and to get their directions for making the repairs in language that is couched in pungent terms.

Starting with the directions for a picket fence the author presents forty-seven different projects found in homes and gardens.

Projection Drawing for Architects

By William Wirt Turner. Cloth, 107 pp., 6⅛ by 9¼ in., illus., $3. The Ronald Press Company, New York City.

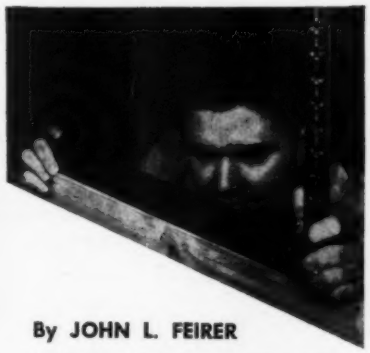
A text designed to give beginning architectural students an insight into the fundamentals of projection in the shortest possible time. It also gives them a mastery of the descriptive method of laying out shades and shadows.

In its seven chapters, the book teaches the student the use of drafting instruments, the making of auxiliary views, the theory of revolutions, first and third angle projections, sections, pictorial drawing, and the development of surfaces.

(Continued on page 42A)

Being accepted everywhere as the best woodworking text

INDUSTRIAL ARTS WOODWORKING



By JOHN L. FEIRER

Professor of Industrial Education, Western Michigan College of Education.

NEW COMPLETE text for the woodworking shop. The result of seven years planning and research, this book meets every need of classes at the junior and senior high school level.

Divided into four major parts for convenient shop use: (1) Fundamental processes in hand woodworking. (2) Basic machine tools in woodworking. (3) Related information about wood and wood products . . . opportunities in woodworking. (4) A variety of well-designed "different" projects.

A COMPREHENSIVE text! Covers step-by-step procedures from cutting out the rough stock to finishing the project. Includes 46 helpful steps in correct hand woodworking procedures. A look will cnovince you that it's the outstanding book in its field for years to come.

Typical of many endorsements, **". . . the best on woodworking which has been published to date."**

. . . Contains 478 photos and drawings

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. . . 44 beautiful and practical projects.

See for yourself . . . circle figure 1 in coupon for 30 days examination with view to adoption.....**$2.60**
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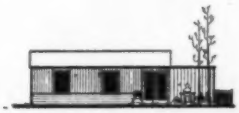


New... REVISION

WOODWORKING SERIES now available. Metalworking and Craft series to come. Visual education has proved itself as a stimulating way to get across lecture points . . . eliminates constant explanation. Students find filmstrips refreshing and easy to understand because they not only show how to perform a task . . . they show the task actually being performed.

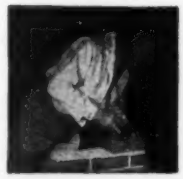
MAKING A PROJECT WITH HAND TOOLS (No. 4 in coupon). WOODWORKING MACHINES (No. 5 in coupon). FURNITURE JOINERY (No. 6 in coupon). SAFETY "KNOW-HOW" IN THE WOODSHOP (No. 7 in coupon). Each....$3.00
***NOTE:* We cannot send filmstrips on approval.**

Problems in ARCHITECTURAL DRAWING

This text, for years recognized as one of the best, is now better than ever. Enlarged to include modern ranch type houses, ultra-modern public buildings, etc. Retains those problems small enough for the high school draftsman to understand: summer cottages, garden structures, garages, etc.

By Franklin G. Elwood, who as resident architect at the famous Mooseheart Colony understands boys in a way few could match. Co-responsible for the multi-million dollar building program at Mooseheart, he is a great teacher and a man of taste and intelligence. His style is simple, clear and straightforward.

NEW LOW PRICE — **$2.80.** Five or more copies, each, **$2.10.** Circle No. 2 in coupon.



ART OF BRICKLAYING

Everything the student bricklayer should know. This NEW book discusses every bricklaying process step-by-step . . . covers tools, mortars, brick and scaffolding. Shows 42 bond patterns . . . the principles of chimney construction and special skill brickwork. Also covers cement block work. Contains speed exercises and 484 trade terms. Author J. Edgar Ray, Associate Prof. of Industrial Education, Stout Institute, has worked in the trade and taught bricklaying for 42 years.....$4.00
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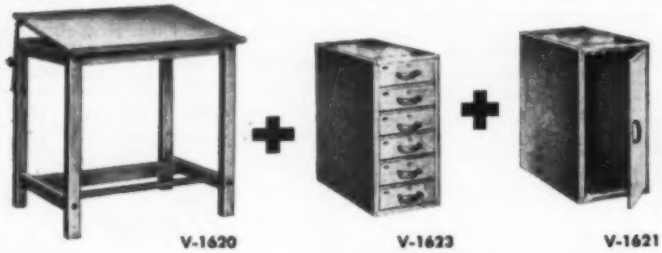
Too many drafting students and not enough room?

Hamilton has the answer!

HERE'S HOW IT WORKS—This simple, sturdy, good-looking Student Drafting Table Assembly is composed of three units, giving it real space-saving flexibility. The Assembly consists of the table (V-1620), the tool drawer unit (V-1621) and the board storage unit (V-1623). Storage units can be arranged to make maximum use of floor space.

FOR EXAMPLE—An entire aisle can be eliminated by placing two rows of tables together. The left-hand row would have the tool drawer unit at right-front and the board storage unit at left-rear, opening to the left-hand aisle (as illustrated). Storage unit arrangement in the right-hand row would be reversed.

This Student Drafting Table Assembly is solidly built of Northern Wisconsin Birch, finished in Golden Brown. Find out for yourself about Hamilton's traditional quality and efficient work-design. You'll be amazed at how little it costs . . . see your Hamilton Dealer now . . . or write us for full details.



V-1620 V-1623 V-1621

Hamilton

MANUFACTURING COMPANY
Two Rivers, Wisconsin

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Shop Equipment News

NEW PRODUCTS — PUBLICATIONS

NEW NO. 45 "YANKEE" PUSH DRILL

Stanley Tools announces that North Bros. Mfg. Co., Philadelphia, Pa., now offers the new No. 45 "Yankee" push drill with 8 drill points in the magazine handle. This new "Yankee" drill is designed for drilling small holes in wood or plastics.

Its chuck makes it easy to insert drill points, and hold them securely. The handle, made of

No. 45 "Yankee" push drill

tough black plastic and polished aluminum, contains eight drill points, individually stored — in full view for easy selection. Sizes range from $\frac{1}{16}$ to $\frac{11}{64}$ of an inch. Fluted aluminum cap unscrews quickly, revealing eight drill points in full view. Over-all length with drill point in chuck — $10\frac{1}{4}$ in.

Stanley Tools also announces a new set of wood patterns for six small-size projects. They sell at 25 cents per set. They are ideal for elementary industrial-arts classes and for beginning students who are not familiar with working drawings.

The set contains patterns that may be traced directly on the wood by means of carbon paper. They include a wall plaque, phone holder, wall shelf, pipe rack, plant bracket, and a novelty table.

The folder containing the six pattern sheets gives simple directions to help the beginning student.

For complete information address *Stanley Tools, New Britain, Conn.*

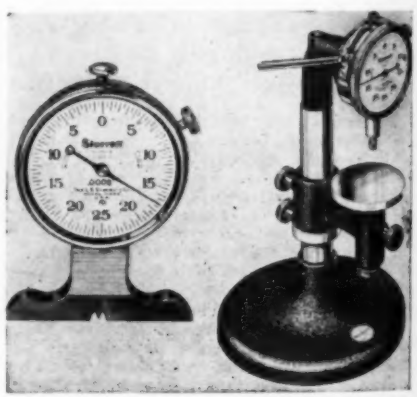
For brief reference use IAVE — 0901.

STARRETT PRECISION GROUND DIE STOCK, AND NEW GAUGES

The L. S. Starrett Company has recently published bulletin No. 1103 which not only contains a complete listing of all available sizes of Starrett precision ground flat stock and die stock, oil hardening, oil and water hardening, and water hardening types, together with prices, but also presents new and useful information on structure and analysis, heat treatment, and tempering.

This firm also markets two new gauges. No. 643 gauge is especially useful for measuring the depth of small holes, recesses, slots, etc., which are too small for any ordinary depth gauge.

The knife edge base is $2\frac{1}{2}$ in. long and in combination with a needle-point rod permits exact positioning of the needle point relative to the surface to be measured. The center of the base is cut out to permit unobstructed view of the point. Base and point are hardened, ground and lapped.



New Starrett gauges Nos. 643 and 652

No. 652 is a universal dial bench gauge. Plus or minus variations from size in .0005 of an inch can be read off instantly from the indicator. Readings are uniformly accurate because of predetermined spring contact pressure entirely independent of the operator's "feel." It is equally suitable for use as a comparator or a thickness gauge to measure rubber, textile, paper, metal parts, leather, veneer, mica, celluloid, cardboard, fabrics, etc., on either flat, curved, or irregular surfaces.

Although other styles of indicators can be supplied the No. 25-B is regularly furnished, graduated .0005 in., dial reading 0-25-0, range .125 in.

For complete information write to *The L. S. Starrett Co., Athol, Mass.*

For brief reference use IAVE — 0902.

(Continued on page 34A)

Drafting Simplified

new!

by Elmer A. Rotmans

400 pages

Clothbound . . . $3.75

Complete, progressive and profusely illustrated, this new text is an outstanding example of good instruction material. The pattern is that of presenting the content through clear, illustrated information sheets, and of providing application through definite assignments and step-by-step instructions for assignment drawings. This text is ready-to-use, requiring no additional organization or preparation of material. Because of the logical sequence of instruction units, it is possible to give effective individual instruction, and to supervise efficiently groups including various levels of proficiency.

The text and companion workbooks is recommended for junior and senior high school drafting and mechanical drawing classes, for technical and beginning engineering groups, and may be easily adapted to home study. A Teacher's Key, showing the completed assignment drawing, is designed to simplify correcting and evaluating students' drawings. A series of four Workbooks will be available using actual drawing paper and giving starting points for each assignment drawing.

Check These Outstanding Characteristics!

- ★ *Instruction material is ready-to-use, as is.*
- ★ *Students of diverse ability may be included in same group. Beginners and advanced students may be taught simultaneously.*
- ★ *Can be used effectively by teachers who lack practical drafting room experience.*
- ★ *Each unit built on preceding units so reference and review can easily be made.*
- ★ *Units are so complete that unnecessary time-wasting questions of procedure are avoided.*
- ★ *More supervision can be rendered and additional aid given when needed, as time is spent "teaching," not "preparing to teach."*

DRAFTING SIMPLIFIED is available for immediate distribution. The Teacher Key and Workbooks to follow in October. We invite you to examine this superior text. *Write Dept. IA-950.*

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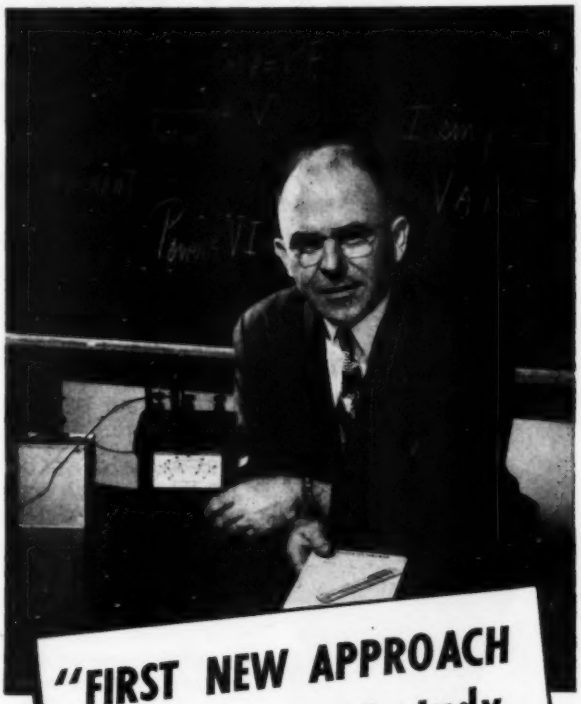


"FIRST NEW APPROACH to a-c current study in 50 years"

—says Professor Harold W. Bibber, head of Union College's Electrical Engineering Department

G-E's AF-2 Load Visualizer provides an easier way to introduce students to current-vector analysis. You needn't interrupt your explanation of principles to make lengthy computations. The instrument and calculator get the answers quickly and simply.

—Check these features—

- **Measures volts and vector amperes**
- **Watts, power factor, and vars can be quickly determined**
- **Wide current and voltage range**
- **Net educational price $88.00**

For complete information, call your nearest G-E office or write for bulletin GEC-372. Apparatus Dept., General Electric Co., Schenectady, N. Y.

GENERAL ELECTRIC

SHELDON
CHICAGO

makes all 3

Write for the SHELDON Catalog showing and describing (with complete specifications) the line of: SHELDON Precision Lathes (9", 10", 11" and 13" Swing), Sheldon Milling Machines, Sheldon Shapers and Sheldon Machine Tool accessories and attachments.

THESE 3 quality machine tools are especially adapted to school use because of their:

AMPLE SIZE — permits wide range of practical projects.

STANDARD DESIGN — true industrial tools with standard contracts.

PERMANENT ACCURACY — these tools hold their accuracy under student abuse, do not require constant rebuilding and servicing.

SAFETY — all drives completely enclosed; all speed changes made by external levers.

PRICE — these are moderate priced tools that school shops can afford.

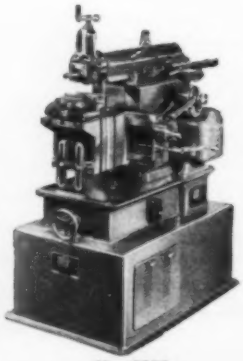
SHELDON MACHINE CO. Inc.

Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers

4244 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

No. 3000
Milling Machine

No. TS56B
11¼" Swing Lathe



No. 8000
12" Shaper

SHOP EQUIPMENT NEWS

(Continued from page 32A)

PROTO MOBILE TOOL CABINET

Interchangeability of drawers, which makes it possible for every buyer to custom build his own cabinet, is the outstanding feature of the new Proto Toolmobile tool cabinet. Easy-to-move drawer runners, that fit into notches spaced every 2 in. from top to bottom, permit any of three basic sizes of drawers, 2, 4, and 6 in. deep, to be installed in any combination or arrangement.

The cabinet — No. 9968 — is constructed of heavy gauge welded steel, and critical points are strongly reinforced. Round corners, extra heavy bottom channels (through which caster plates are bolted), double side walls, hemmed drawer edges, and a midfront stiffener assure rigidity and proper drawer alignment.

Adjustable dividers form various-sized compartments in the drawers. Tough rubber 5-in. casters on ball-bearing swivel plates roll easily and quietly. Two casters have handy foot-operated brakes.

A single-lock front closes the entire cabinet. Other features include an 18 by 28-in. Masonite working surface, tool retaining rail around three sides, two felt inserts in the shallow drawer, two 15-in. handles, and a useful light assembly with gooseneck that reaches over the front for lighting the drawers.

This firm also has added several new Proto puller items to its line. These include a bearing separator-puller plate, 14 step plate adapters, 2 jaws, and 2 screw tips.

Separator-puller plate No. 4032 has flat surfaces and knifelike edges that permit insertion behind many bearings, gears, etc., where space is too limited for heavy puller hooks. It protects expensive bearings from damage while being pulled.

The step plate adapters fit into the ends of hollow shafting or housings and provide a base for a puller screw when forcing off bushings, gears, pulleys, etc. They are useful also for installing oil seals. The 14 sizes, Nos. 4041-1 through 4040-14, range from ¾- and 1-in. diameters to 2⅜- and 2⅞-in. diameters.

For further information write to *Plomb Tool Co., Los Angeles, Calif.*

For brief reference use IAVE — 0903.

New Proto "Toolmobile" with accessories

NEW VENUS VELVET PENCIL MERCHANDISER

The American Lead Pencil Co., has just introduced a new merchandise full-view display unit,

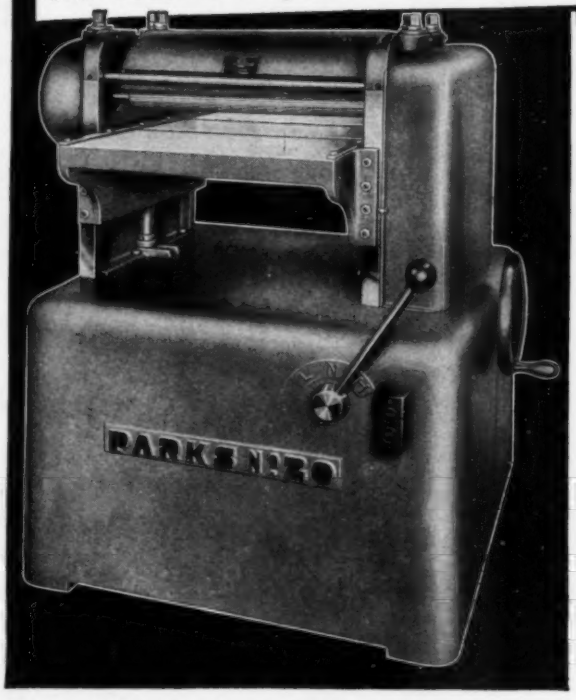
New pencil dispenser

No. 1652D, which holds one gross of "Venus Velvet" pencils.

The unit is only 4 in. in diameter at the base,

(Continued on page 36A)

The Sensationally NEW Low-Priced



PARKS No. 20 20″ PLANER

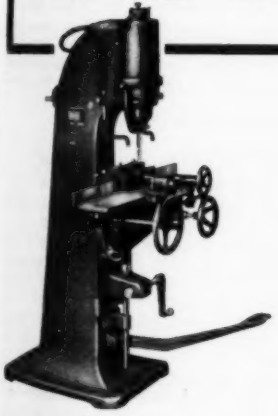
Here is a modernly designed, rugged, high-speed, low-priced planer that is ideally suited for every shop and industrial plant requiring a quality surfacer. The Parks No. 20 Planer has a four-knife cutterhead with a speed of 3600 R.P.M. and offers two feed speeds — 20 and 40 F.P.M., and 40 and 80 F.P.M. Write for complete descriptive literature.

The PARKS Heavy-Duty 12″ x 4″ Planer

A compact, sturdy, thickness planer that offers mill planer precision and ruggedness at a sensationally low price. Write for descriptive catalog sheet.

The PARKS WOODWORKING MACHINE CO., Dept. 22-UU 1546 Knowlton St., Cincinnati 23, O.

"OLIVER" Foot Feed, Vertical, Hollow Chisel MORTISER



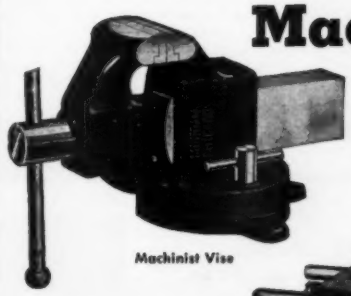
- Universal Compound Table
- Quick Detachable Tools
- Double Pressure Foot Lever
- Rigid Non-Yielding Column
- Blower Fan Integral

This "Oliver" Mortiser is ideally suited to the work of school shops. Makes mortises neatly, quickly, accurately. Has new mortising head, ball bearing motor and ball bearing spindle. Quick return stroke. It is compact, sturdy, easily accessible. Latest safety devices. Easy to operate.

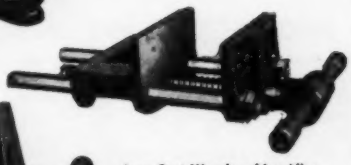
Write for Bulletin No. 91-D

OLIVER MACHINERY COMPANY, GRAND RAPIDS 2, MICH.

MORGAN Woodworkers' Machinists' VISES



Machinist Vise



Low Cost Woodworking Vise

Continuous Screw Quick Action Vise

VISES FOR EVERY PURPOSE

MORGAN VISE COMPANY

120 N. JEFFERSON ST. CHICAGO, ILL.

TACKLE BUILDING!

Insures Enthusiastic Participation of Students

Include Tackle Building in your school shop schedule and develop enthusiastic, painstaking workmanship in your trainees from Junior High School through adult groups. Over 1500 schools are now doing so and are gratified by the results. They report that it creates a pride of accomplishment and a real sense of achievement in all age groups.

Fully illustrated, step-by-step instructions guide the apprentice through an ideal elective project — challenging yet entirely within his ability. Only the simplest hand tools are required.

SPLIT BAMBOO ROD BUILDING KITS for 1- and 2-piece Casting, 2- and 3-piece Fly, Spinning, Weak Fish, Boat, Surf, Squidding and Salmon Rods.

GLASS ROD BUILDING KITS for Casting, Fly, Weak Fish, Boat and Surf Rods.

STEEL ROD BUILDING KIT for Casting Rods.

SPINNER BUILDING KIT for Casting and Trolling Spinners and Spinning Lures.

FLY TYING KITS.

ALL KITS ARE SOLD ON AN APPROVAL AND FULLY GUARANTEED BASIS

MAIL THIS COUPON FOR COMPLETE INFORMATION

EMPIRE TACKLE COMPANY, INC.

2 GENESEE STREET NEW HARTFORD, N.Y.

Please send me complete information, prices and sample instructions

NAME..... TITLE.....

SCHOOL.....

ADDRESS.....

CITY..... ZONE..... STATE.....

SHOP EQUIPMENT NEWS

(Continued from page 34A)

and it is 9½ in. high. It is made of clear acetate allowing the color of the pencils to show through.

This firm also has issued its new 1950–51 illustrated price list. It contains a complete listing of pencils; untipped, drawing, and colored; refill leads, penholders, crayons, companion boxes, and erasers. Also included is a complete listing of fountain pens, ball point pens, and mechanical pencils.

For further information write to the Advertising Department, *The American Lead Pencil Company, Hoboken, N. J.*

For brief reference use IAVE — 0904.

NEW LUFKIN STEEL TAPE-RULES

The popular Lufkin Mezurall and Wizard Jr., steel tape rules now have chrome-clad nonglare satin finish blades. These chrome-clad blades absorb disturbing light reflections and afford easier reading of all markings and graduations.

New Lufkin steel tape-rules

The manually operated chrome-clad blades run smoothly out of and into the case. Balanced construction holds the blades at any length withdrawn. They are held in the case by a stop catch guarding against breakage when not in use. Blades are replaceable, and the patented self-adjusting end hooks have an automatic sliding action affording accurate butt-end and hooked-over measurements.

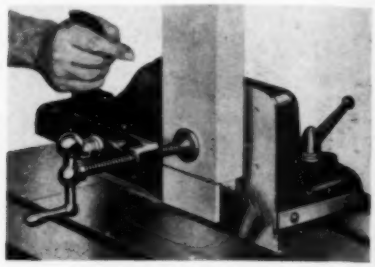
The heavily plated cases have flush inset side plates and they fully enclose the chrome-clad blades.

Complete information is obtainable from *The Lufkin Rule Co., Saginaw, Mich.*

For brief reference use IAVE — 0905.

THE DELTA TENONER

The new Delta Tenoner, supplied by the Delta Power Tool Division, Rockwell Mfg. Co., makes it possible to cut square, parallel tenons safely on any table saw having a ⅜ by ¾-in. miter-gauge groove. Work is fed to the saw with one hand, well away from the revolving blade.



A safe tenoner

This tenoning jig takes stock up to 2¾ in. thick in any width within the capacity of the saw and cuts tenons to the full capacity of the saw. With the addition of spacing collars and an extra saw blade, ¼- or ⅜-in. tenons can be cut at one pass.

Further information may be obtained by writing to the *Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee 1, Wis.*

This firm has also published a colorful 20-page booklet, "Unlimited Applications," which tells the story of the Delta Multiplex, "a low-cost, school woodworking shop."

This booklet shows how the simplicity of a Delta Multiplex helps students learn all woodcutting operations with greater safety and with fewer mistakes. This portable machine brings new flexibility to wood cutting, as its double radial action provides two fully usable 360-deg. radial movements.

The booklet also describes four Delta Multiplex models and a complete line of accessories.

"Unlimited Applications" is available free on request to *Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee 1, Wis.* Ask for Bulletin AD-564.

For brief reference use IAVE — 0906.

ATF EXHIBIT OF MODEL SCHOOLROOM PRINT SHOP

A scale model of a schoolroom print shop representing a 26 by 40-ft. graphic-arts classroom, will be a special feature of American Type Founders' exhibit at the Sixth Educational Graphic Arts Exposition in Chicago, September 11–23. The model is made to a scale of two inches to the foot, and reproduces an ideal layout for a senior high school group of from 15 to 19 students.

The equipment required for such a classroom is represented by scale models, and includes six type cabinets, a planning table, two lever presses, a proof press and galley cabinet, a stereotype unit, a bindery table, a platen press, paper cutting and bookbinding units, and a table for silk screen and art units.

Among equipment of particular interest to the educational field, ATF will exhibit the Little Giant No. 6 press, which occupies less than 20 square feet of floor space, has a sheet range from 3¼ by 5½ inches to 12 by 18 inches, and speeds up to 5000 impressions per hour.

(Continued on page 39A)

The Artist?
Merritt Dana Cutler, one of the first to advance the art of scratchboard drawing and author of "Scratchboard Drawing."
The Illustration?
"Steel versus velvet. Scratchboard is a pliable medium," says Mr. Cutler, "despite its definiteness. Here is a case where the French curve comes into its own."
The Medium?
Higgins Waterproof Black Ink, in the estimation of Mr. Cutler, is "the best black to use" and may be applied by hand with a brush, sprayed on with an airbrush, or patted in place with a piece of cotton.
HIGGINS
SINCE 1880
THE BASIC ART MEDIUM
HIGGINS INK CO., INC.
271 NINTH ST., BROOKLYN 15, N.Y.
BY PERMISSION OF WATSON-GUPTILL PUBLICATIONS, INC., N. Y.

...That allowed me to get away EARLY

"Yes, it was quite a relief to list the varnishes, stains, brushes, glue, lumber, metals and replacement tools on one memorandum and mark it for mailing to Brodhead-Garrett. That allowed me to get away earlier than on previous occasions."

Brodhead-Garrett's complete catalog of training supplies not only permitted this instructor to save time, but eventually saved the time of the entire office staff. For one order became one bookkeeping entry, one receiving order, and one payment. This economy is responsible to a large extent for the remarkable growth of Brohead-Garrett as the nation's foremost supplier in the industrial arts field.

Save time all along the line, submit entire material list to B-G.

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RESPONSIBILITY
BOOKKEEPING ENTRY

BRODHEAD GARRETT CO.

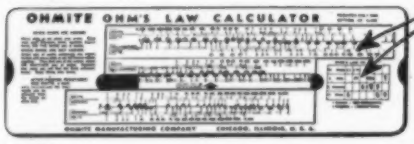
AVOID EXTRA HANDLING, SEND ENTIRE MATERIAL LIST TO B-G

4560 E. 71 ST. CLEVELAND 5, OHIO "EVERYTHING IN INDUSTRIAL ART SUPPLIES"

HELPFUL CALCULATOR FOR STUDENTS **Solves**

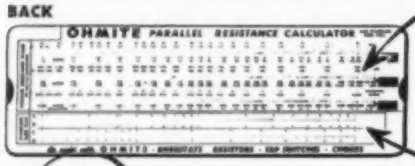
Ohm's law problems

FRONT



OHM'S LAW SCALES

BACK



PARALLEL RESISTANCE SCALES

STANDARD SLIDE RULE SCALES

ONLY 25c

TEACHERS! Write for Special Quantity Price

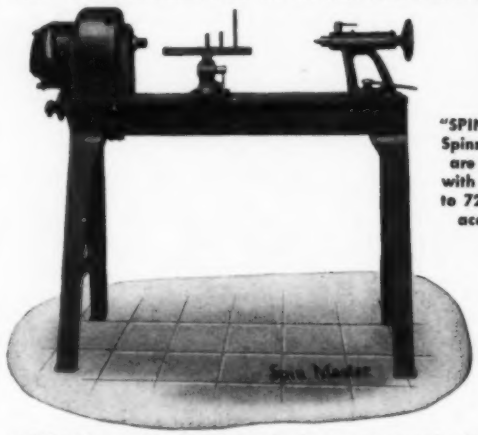
Here is the famous Ohmite calculator, popular the world over with engineers and students. Solves Ohm's Law and many parallel resistance problems—simply, quickly, and accurately—with only one setting of the slide. All answers read directly. Slide rule scales multiply, divide, find squares, square roots, etc. Handy size—9" x 3"—fits the pocket.

OHMITE MANUFACTURING CO., 4994 Flournoy St., Chicago 44, Ill.

Spin Master

REG. U.S. PAT. OFF.

15 "METAL SPINNING LATHE"



"SPIN MASTER" Spinning Lathes are available with swings up to 72", also all accessories.

- Spin Master Metal Spining Lathes are known in the trade to be the most substantial and the most productive causing lesst operator fatigue.
- They are also best for training purposes.
- The Model MS 15 shown above is not a converted wood turning lathe. It is engineered for fast production spinning. Available with floor or bench legs.

Write for particulars.

HAAG MACHINE CO.

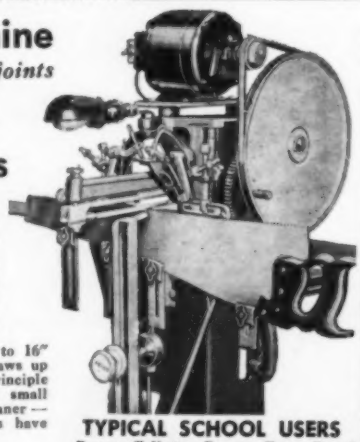
221 WARBURTON AVE. HAWTHORNE, N. J.

SAW FILING

This ONE Machine

automatically files and joints

HAND, BAND, CIRCULAR Saws



The Foley Saw Filer is ideal for sharpening saws used by students in school shops. It keeps them in tip-top shape, faster and better than by hand filing. Used by Army, Navy, hundreds of manual training departments and industrial plants. The Foley is the only machine that files and joints all hand, back and mitre box saws from 3 to 16 points per inch, crosscut circular saws up to 16" diameter (24" optional), and band saws up to 24' long. Patented jointing principle automatically evens up large and small teeth, so saws cut faster, truer, cleaner — stay sharp longer. Foley filed saws have less breakage and last longer.

30-DAY TRIAL OFFER

You may have the privilege of using the Foley Saw Filer in your own shop for 30 days. Write or send coupon for details and list of school users.

TYPICAL SCHOOL USERS

Berea College, Berea, Ky.; Board of Education, Cleveland, Ohio; Boys Technical H. S., Milwaukee, Wis.; Charleroi School District, Charleroi, Pa.; Redlands Public Schools, Redlands, Calif.; Stout Institute, Menomonie, Wis.

FOLEY Automatic SAW FILER

FOLEY MFG. CO., 3318 N.E. 5th St., Minneapolis 18, Minn. Please send full information on 30-Day Trial Offer and list of school users of Foley Saw Filers.

Name.....

Address.....

School.....

Do you have your UP-TO-DATE edition of ...

DICTIONARY OF TECHNICAL TERMS

By Frederic S. Crispin

An indispensable part of every shop, this revised and enlarged eighth (1948) edition contains many terms and definitions not found in earlier editions, particularly in the fields of television, plastics, radio, electricity, aeronautics, auto mechanics, and welding. Includes over 10,000 terms used in woodworking, metalworking, electricity, machine-shop work, and countless other trades.

$3.25

Examination copies sent on 30 days' approval

THE BRUCE PUBLISHING COMPANY

709 Bruce Building Milwaukee 1, Wisconsin

SHOP EQUIPMENT NEWS

(Continued from page 36A)

American Type Founders' display at the Graphic Arts Exposition in Chicago

Left to right: Robert G. Marquardt, ATF vice-president; Edward G. Williams, president; Bradford T. Blauvelt, executive vice-president; Donald Desky, industrial designer; and Frank G. Gerhart, A.T.F. advertising manager.

A.T.F. also issues an "Idea File" the first of which appeared in the spring of 1950. It consists of samples of school printing chosen for their originality, social, and educational value. These folders will be of immense value to boys studying printing throughout our country, and new ones will be issued from time to time.

For further information about "Idea File" write to *American Type Founders, Department of Education, 200 Elmora Ave., Elizabeth, B, N. J.*

SAFETY IN THE AUTO-MECHANICS SHOP

LOUIS BAROCCI
High School
Cudahy, Wis.

The worker in the auto-mechanics shop must be constantly alert to the many accident hazards offered by that shop. The elements of danger incident to the presence of gasoline, poisonous gases, acids, and careless blocking and workmanship must ever guide the careful auto mechanic.

In securing safety data for the auto-mechanics shop, the writer interviewed a teacher of auto mechanics and carefully reviewed the following literature: *Manual of Safety Instructions for Vocational and Industrial Arts and Safety Standards and Recommendations for School Shops.*[1]

1. No student should ever work under a car until he has checked to see that the car is safely blocked or suspended, or that it is resting normally on the floor. Never depend solely on hoists to support a car, but block the car so that if the hoist should fail, the block will prevent an accident.

2. Creepers should not be left on the floor where they may cause someone to fall. Stand them on end out of the way.

[1]Walter E. Belliet, Instructor of Auto Mechanics, Hastings, Neb.: *Manual of Safety Instruction for Vocational and Industrial Arts*, Santa Ana High School Press, 1937, pp. 38-39; *Safety Standards and Recommendations for School Shops*, Lancaster, Pa., 1934, pp. 94–115.

3. Before turning over an engine by hand, be certain that the crank fits securely.

4. Unless the nature of the work demands that they be left open, always keep car doors closed.

5. When doing extensive work on transmission, clutch, or motor, disconnect one cable from the battery to starter. Remember that someone may depress the starter button while you are working on the car.

6. When cutting off flywheel teeth with a chisel, always guard against their striking anyone.

7. A slipping wrench may cause a serious injury; therefore, never use a wrench with a cracked or worn jaw.

8. Make certain that wrenches fit the job. Wrenches that are too large slip easily.

9. Play no pranks with a creeper.

10. Insist on good and well-insulated cords for portable drills and extension cords.

11. Never use a file without a handle.

12. Permit no chisel or punch to become mushroomed. Grind off the first semblance of mushroom.

13. Permit no oil or grease spots to remain on the floor. Wipe up the grease and oil immediately, or cover with sawdust or sand.

14. Be careful of sharp-pointed oilcans. Do not leave them where men may fall upon them.

15. Carrying sharp tools in your pocket invites injury.

(Continued on next page)

"The Trade Mark of Quality"

We are prepared to supply you at all times with many kinds of highest quality materials, measured and graded in the best interpretation of current national grading rules.

WE ALSO OFFER A SOURCE OF SUPPLY FOR:

Ball Bat Blanks . . . Formica . . . Bed Panels...Furniture Squares . . . Bed Slats . . . Glues . . . Boat Panels . . . Rez . . . Bow Staves . . . Sample Sets . . . Closet and Chest Lining . . . Table Legs . . . Walnut-Cedar Chest Sets . . . Dowels

Write for Industrial Arts Catalog Containing Description of Various Kinds of Wood and Price List.

PAXTON LUMBER

adds beauty and durability to all woodworking projects

Modern school shops are assured of first quality materials when using Paxton lumber and plywood. That is because Paxton products meet every requirement of careful selection, grading, and uniformity. As a result, the student enjoys greater satisfaction from his efforts to create attractive articles out of wood and the shop benefits by the long-range economy that reliable materials insure.

FRANK PAXTON LUMBER COMPANY

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Specialists in Industrial Arts Lumber and Plywood

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This short unit course, prepared by John Amiss, prominent training director, makes it a simple matter for you to do your share toward overcoming economic illiteracy. Easily incorporated in any course without disrupting the class. Essential information that bears directly on the jobs we hold.

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Safety — Auto Mechanics

(Continued from previous page)

16. Render first aid to cuts and bruises.
17. When working under the car, protect your eyes.
18. Keep all oily rags in a fireproof container and empty the container periodically.
19. Do not permit students to solder, braze, or weld closed cans or tanks which have contained gasoline.
20. Don't play with the compressed air hose. Particles of dirt or metal may be blown into someone's eyes.
21. When putting or taking off a battery from the charging line, always turn off the current to the battery charger.
22. A spark may easily ignite gas from a battery.
23. Never stand over a battery when working on it. An explosion of sprayed acid may injure your eyes.
24. When cranking a car:
(*a*) Be certain that the engine is in neutral and that the spark has been retarded.
(*b*) Stand a little back from the crank in an easy position.
(*c*) Avoid straightening the arm at the elbow.
(*d*) Keep the thumb on the handle of the crank next to the forefinger.
(*e*) Avoid spinning the motor.
25. Permit only students who possess a driver's license to make test runs on cars.
26. Do not run engines in a closed shop. Keep the shop well ventilated.
27. Unless the windows of the car are open, never sit in a parked car when the engine is running. Carbon monoxide may filter through the floor boards and cause illness or even death.
28. Never ride running boards, hoods, or fenders. Doing so always invites an accident.
29. Don't be so smart as to see how "close you can come to someone."
30. Before the automobile is brought into the shop, all gasoline must be drained.
31. Before the car is brought into the shop, the carburetor of an engine must be run dry.
33. Before working on the power plant of of gasoline in the auto shop, and that only in an approved container.
33. Before working on the power plant of the car, disconnect the battery and insulate connections.
34. Use care when draining radiators, when removing radiator caps, and when removing hose connections. If you do this you will avoid burning yourself with the hot water and steam.

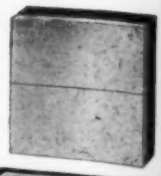
In 1949, 31,800 Americans were killed in traffic accidents. — *The Travelers*, Hartford, Conn.

Less than 1 per cent of loans made to veterans have been in default to the extent that Veterans Administration had to make good the guaranteed and insured portions.

HERE IS A PROJECT YOUR SCHOOL CAN USE

Hotpack KILN KIT

EVERYTHING YOU NEED TO MAKE THIS PROFESSIONAL LOOKING ELECTRIC KILN



LARGE CHAMBER
12" deep
11" wide
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SENSATIONAL VALUE

YOU GET: Illustrated instruction Manual, Insulating Back Up Material, Insulated Cover & Handle, Wire — Screws — Terminal Board, Insulating Brick — cut to size, Sheet metal case — Welded & Painted, Hotpack Heating Elements, wired 15 Amps — 115 volt — *Ready to install.*

Send for Descriptive Folder

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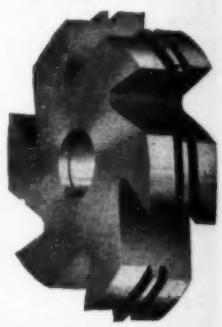
You Can Depend On

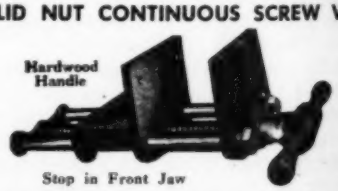
Champion Two-In-One Glue Joint Cutter



This cutter makes a perfect glue joint with a single cutting tool, formed that a tongue and groove fit perfectly by reversing stock. Time saver in changing cutters and handling stock. Extra holding surface for the glue.

- Also Mitre Lock Glue Joint Cutters.
- Also Quick Acting Vises and Universal Vises.

SOLID NUT CONTINUOUS SCREW VISE



Stop in Front Jaw

Designed and built to withstand the most severe service. The extra heavy Cold Rolled Screw and SOLID BRONZE NUT will last a lifetime.

Full Line of Tools, Machinery & Equipment for Woodworking Shops

Write today for large catalog showing complete wood shop equipment.

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Better Tools
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TRIANGLES — PROTRACTORS
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ENGINEERING MANUFACTURING CO.
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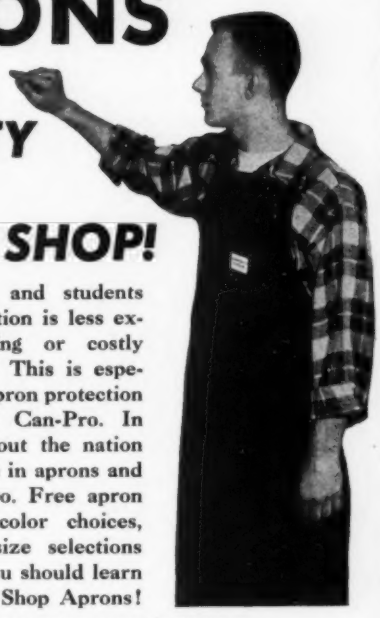
APRONS
. . . are a
NECESSITY
in the
SCHOOL SHOP!



Parents, instructors, and students agree, "Apron protection is less expensive than cleaning or costly clothes replacement." This is especially true when the apron protection is Shop Aprons by Can-Pro. In school shops throughout the nation the instructors' choice in aprons and shop coats is Can-Pro. Free apron with every dozen, color choices, Organization Plan, size selections . . . all are reasons you should learn more about Can-Pro Shop Aprons!

WRITE TODAY FOR LATEST CIRCULAR
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CAN-PRO
"The School Apron Folks"
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IS Better for All Soldering
Ruby's BIG $1 Sample —

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- Rubyfluid —
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AT NEW LOW PRICES

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Illustrates 32 rare and fancy woods, 54 multi-colored bandings, 40 inlays and overlays--in color. Also--31 embossed mouldings, 24 carved ornaments, 275 scroll patterns. And--51 pages of all kinds of tools and supplies plus pages of ideas, instructions, information. Save money, save time--send for your free copy NOW.

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NEW PUBLICATIONS

(Continued from page 31A)

Practical Photography

By Robert A. McCoy. Cloth, 219 pp., 6¼ by 9¼ in., illus., $4. McKnight & McKnight Publishing Co., Bloomington, Ill.

A text and guide for students and amateurs which explains in nontechnical terms how to choose cameras and lenses, make the right exposure, and use films and filters. The developing of the negative, contact printing, and enlarging also are explained.

The principles of art are then taken up briefly and special problems of photography are described.

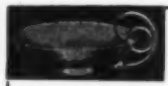
The appendix contains a useful bibliography, formulas for processing films, and twenty recommended exercises for the beginner.

Getting the Right Job

By John H. Weeks. Paper, 16 pp., 5 by 8 in., free. Published by The Glidden Co., 1396 Union Commerce Bldg., Cleveland 14, Ohio.

This is a unique booklet designed for recent college and high school graduates. It is filled

(Continued on page 44A)



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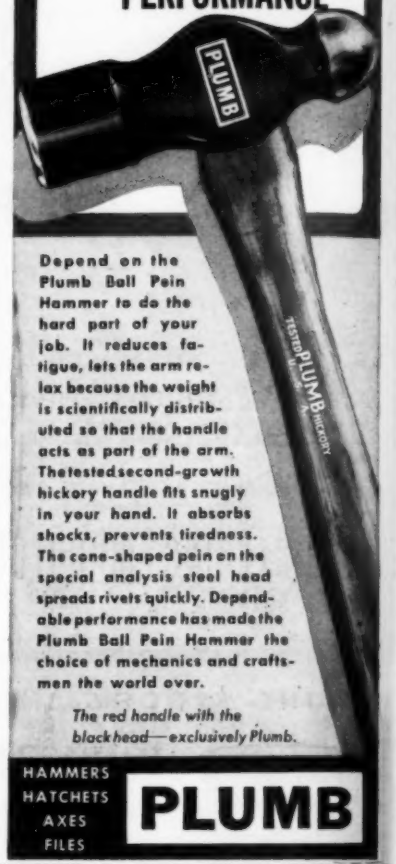

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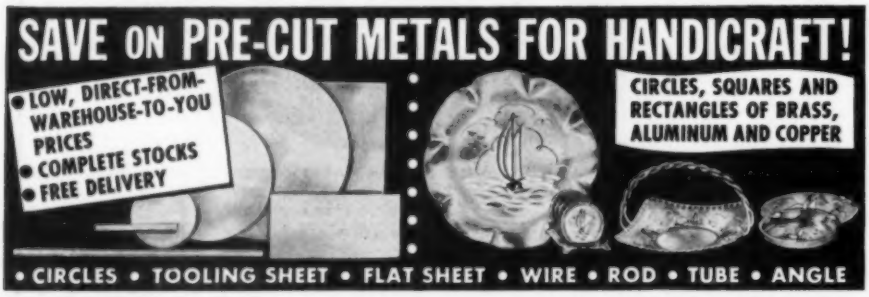

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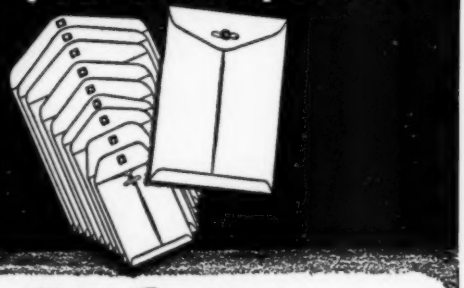

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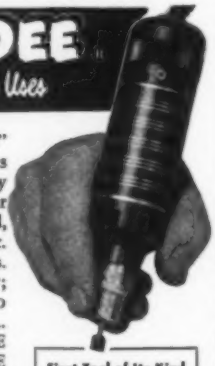

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(Continued from page 42A)

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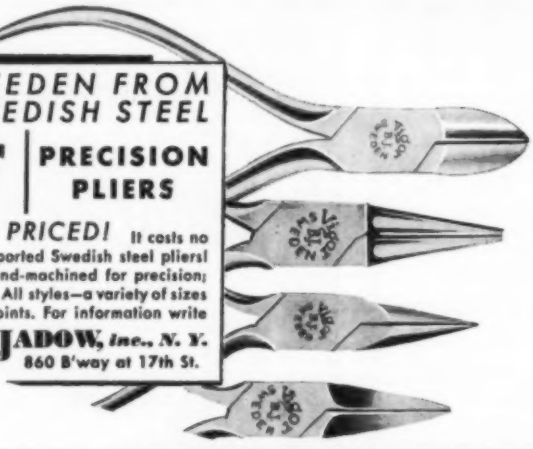

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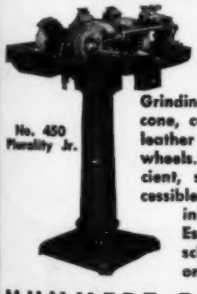

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91	American Art Clay Company	47A
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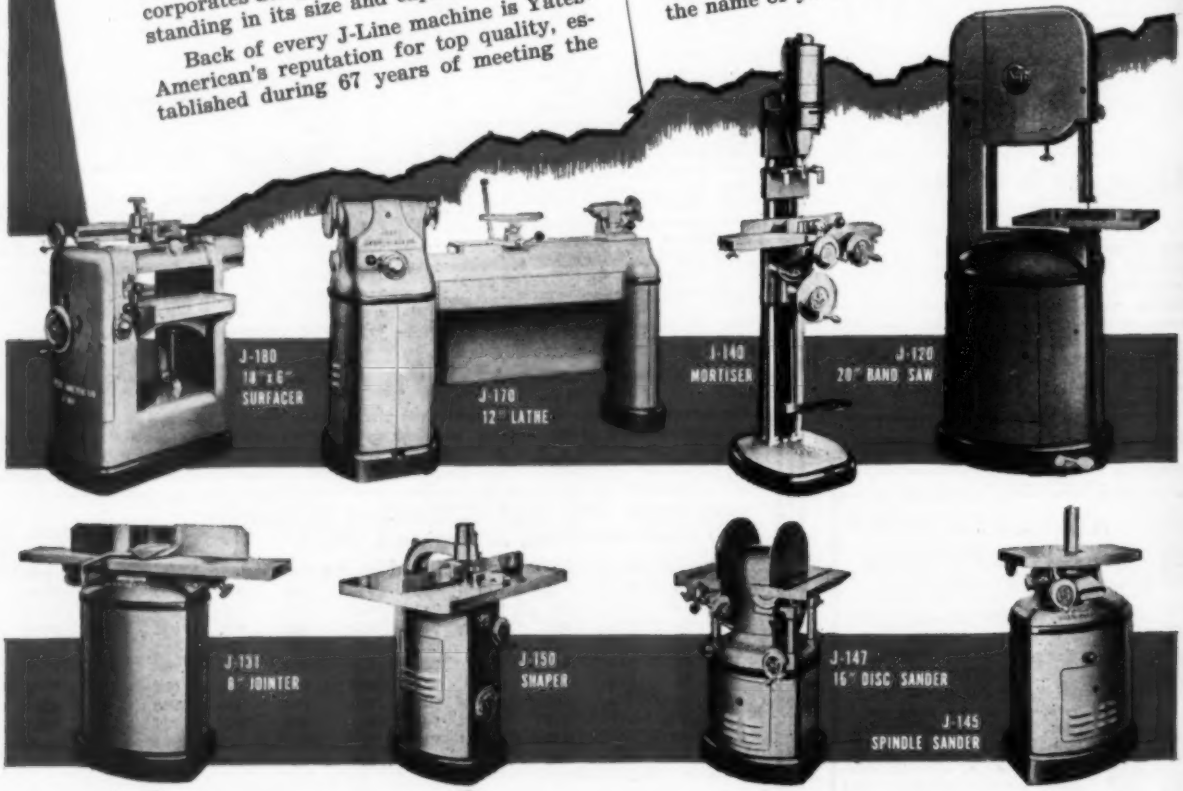

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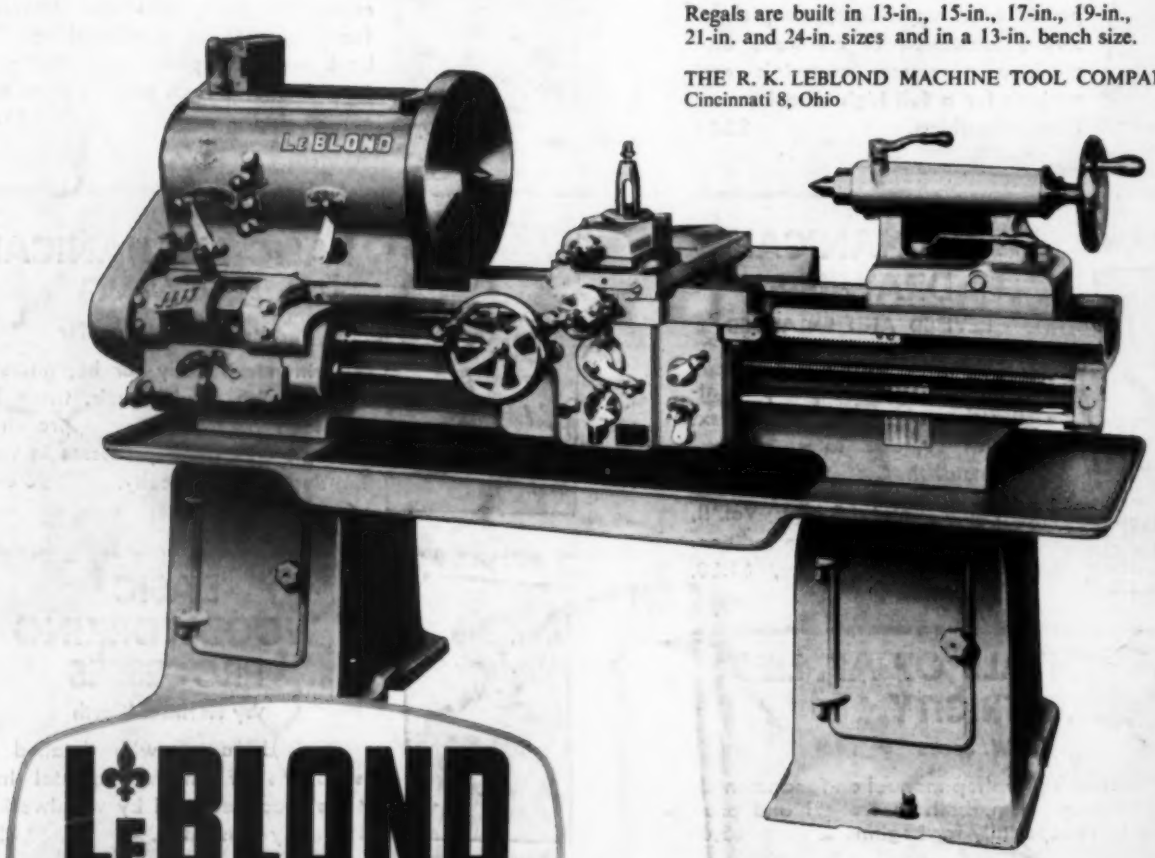

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